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NORTH CAROLINA COASTAL AREA WILDLIFE CONTINGENCY PLAN (WCP)

August 1997 Up-Date

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INTRODUCTION

Oiling has been a documented cause of avian impairment and mortality for over 50 years in North Carolina (Peterson 1942). Reports from coastal National Wildlife Refuges in the early 1940's describe incidents involving in excess of 100 loons, gannets, scoters, and grebes. At that time, response largely consisted of carcass counts to document the significance of oiling as a source of wildlife mortality.

Efforts among natural resource management agencies to coordinate wildlife collection and rehabilitation following spills began in 1982 with the informal *North Carolina Oil and Toxic Contaminants Program* and resulted in the formulation of a Memorandum of Understanding between the U.S. Fish and Wildlife Service (Service) and the North Carolina Wildlife Resources Commission (Commission). The MOU outlined notification procedures, equipment lists, and discussed response strategies. The MOU, which was revised in 1985, 1987, and 1990, was an effective mechanism to coordinate limited staff and equipment of State and Federal natural resource managers.

Since 1990, a new law, revisions to existing law, and revised regulations have greatly expanded the roles of the natural resource management community in spill planning and response. New or modified rules included the federal *Oil Pollution Act of 1990* (P.L. 101-380), the *National Oil and Hazardous Substances Pollution Contingency Plan* (40 CFR PART 300), and the *North Carolina Oil Pollution and Hazardous Substances Control Act* (N.C.G.S. 143.215.86(a) and 143.215.94U(a)).

The *Oil Pollution Act of 1990* (OPA), originally introduced by late North Carolina Congressman Walter Jones as H.R. 1465, created major new authorities addressing oil and hazardous substance spill response. Section 4202 requires pre-planning of procedures for "protection, rescue, and rehabilitation of fisheries and wildlife." It mandated changes in the oil spill provisions of the *Clean Water Act* (CWA) and *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP). Additional responsibilities falling to the natural resource management community include identification and prioritization of sensitive species and environmental environments; identification of potential effects of response and countermeasure activities on fish and wildlife and their habitats; and, planning for monitoring to evaluate the effectiveness of response activities in protecting fish and wildlife.

The resource management agencies are also charged with expanded duties during spill response related to technical support of the On-Scene-Coordinator and natural resource damage assessment. Staff will have to oversee or assist in offering resource protection advice, shoreline countermeasures evaluation, collection of ephemeral data and evidence to support clean-up and damage assessments, incident documentation, and trustee coordination.

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Additional duties were also defined in the realm of wildlife rehabilitation. Specifically, CWA Section 311(d) now requires the NCP to establish a fish and wildlife response plan "for the immediate and effective protection, rescue, and rehabilitation of, and the minimization of risk of damage to, fish and wildlife resources and their habitat that are harmed or that may be jeopardized by a discharge." This information was to include identification of facilities and equipment necessary for deterring wildlife from entering oiled areas, and for capturing, holding, cleaning, and releasing injured wildlife. It was envisioned that new wildlife response plans address identification of primary agency personnel and alternates responsible for coordination of fish and wildlife rescue and rehabilitation, provide for required wildlife handling and rehabilitation permits, and provide guidance on the implementation of law enforcement requirements included under current federal and state laws and corresponding regulations. Requirements include, but are not limited to procedures regarding the capture, transport, rehabilitation, release of wildlife exposed to or threatened by oil, and disposal of contaminated carcasses of wildlife.

The addition of new duties in spill response and new requirements in oiled wildlife collection and rehabilitation points to the need to up-date response plans relative to wildlife. Fortunately, the new laws and regulations did not come without new tools and expertise available to address these issues. This plan aims to identify the agencies, contractors, and other groups involved in wildlife response, discuss their roles and responsibilities, and provide a framework for their coordination during wildlife response efforts.

WILDLIFE CONTINGENCY PLAN
North Carolina Coastal Areas

I. OBJECTIVES OF THE NORTH CAROLINA WILDLIFE CONTINGENCY PLAN

- A. Identify the roles and responsibilities of agencies, wildlife contractors, the responsible party, and other groups involved in wildlife response following oil spills.
- B. Address governmental regulations and general concerns associated with wildlife response after oil spills.
- C. To provide information that enables the wildlife trustees to:
 - 1) focus their efforts on providing wildlife and habitat related technical assistance to the Federal On Scene Coordinator during spill events;
 - 2) record and document injuries to wildlife and habitat;
 - 3) identify organizations qualified to respond to wildlife contaminated by oil;
 - 4) oversee the wildlife response effort; and,
 - 5) promote a coordinated and comprehensive response protocol.

II. OVERVIEW OF WILDLIFE RESPONSE ISSUES

Wildlife response after oil spills is a complex challenge requiring a teamwork approach between trustees, the responsible party, a contracted qualified wildlife responder and carefully trained volunteers.

The top priority for natural resource managers involved with spill response should be assistance to the Federal On Scene Coordinator (FOSC) toward minimizing impacts to important habitat and species. A second priority is the documentation of injuries to wildlife and habitat for restitution purposes. The third priority in response is to rescue and rehabilitation of oiled wildlife. All wildlife actions must be coordinated with the FOSC.

A. Prevent/Reduce Impacts on Key Habitats

Sensitive areas and species have been defined in the two Area Contingency Plans (ACPs) for coastal North Carolina, the *Northeast North Carolina Area Committee Plan* (July 1994) and the *Oil and Hazardous Substances Area Contingency Plan for Southern Coastal North Carolina* (January 1995). The Sensitive Areas Annex (Annex E, Appendix V) of these ACPs include discussions of State- and federally-protected lands and species, important waterfowl nesting and foraging habitats, as well as shoreline sensitivity. It also establishes a Natural Resource Agency Contact list for event-specific information regarding sensitive species and habitats. Mechanisms to protect these important habitats are contained in the available shoreline countermeasures manuals (National Oceanic and Atmospheric Administration 1992, 1994).

B. Field Assessment & Response

Immediate assessment of species at risk must be followed by implementation of wildlife deterrent efforts. This is described in Section V (B). Every manhour and dollar spent preventing contamination of uncontaminated areas, and containing contamination at the immediate spill site, will save hundreds of dollars and manhours later in the response.

The key steps to effective retrieval of contaminated animals are:

- Rapid response by qualified field personnel;
- Careful collection and documentation (noting location) of contaminated animals; and,
- Timely and appropriate transportation to an approved wildlife rehabilitation

facility.

Dead animals should also be collected at this time and placed in the chain of custody of a natural resource agency. Collection efforts must document location. Field notes should be thorough for Natural Resources Damage Assessment (NRDA) purposes. Search and rescue is discussed in Section V (C).

C. Special Concerns in Oiled Wildlife Response

Providing care for injured, orphaned or diseased wildlife has traditionally been undertaken by concerned citizens who operate out of their homes and backyards. Historically, expertise in veterinary medicine, husbandry or biology were not requirements for licensing to hold and treat wildlife.

However, wildlife, like all higher organisms, benefit from professional care for traumatic injuries or diseases. When dealing with wildlife contaminated in major oil spills, additional, and very significant, human safety and wildlife health issues must also be addressed.

1) Human Health and Safety

Risks to staff and volunteers include: traumatic injuries from wild animals; exposure to zoonotic diseases (rabies, chlamydia, salmonella, cryptosporidia, endoparasites, etc.); job injuries occurring at the physical plant; and, most importantly, exposure to harmful components in the contaminant. For those working with oiled animals, the enclosed workspace may limit ventilation, and prolonged and hands-on contact with contaminated animals requires even more stringent protective measures than those specified for field clean-up workers. Further discussion on human health concerns can be found in Section VIII.

2) Wildlife Rehabilitation Needs

For the rehabilitation effort to be successful, each oil-contaminated animal requires immediate and specialized care. When hundreds or even thousands of wild animals become oiled during a spill, the rescue effort becomes a strategically complicated, medically complex, crisis-oriented task.

A variety of wildlife species are at risk to oil spills in and near coastal and inland waters of North Carolina, including: over 200 species of birds and a variety of reptiles, terrestrial and marine mammals. These different species

have individual treatment, handling, housing and nutritional requirements (see Section IX). (The Area Contingency Plan's Sensitive Species Annex [Annex E, Appendix V] includes narratives on the vulnerability of various birds to oiling and population effects of mortality).

A facility must be identified, equipped and managed so as to function in a safe and effective manner. Large numbers of volunteers must be trained, scheduled and continually supervised. Logistics of equipping and managing these facilities are complex and are discussed in Section VI.

3) Disease Outbreaks and Wildlife Health

Every effort must be made to prevent the transmission of disease from rehabilitated animals to free-roaming populations of wildlife.

An epizootic disease is a disease that can affect large populations of animals over a short period of time. Epizootic diseases can be bacterial, viral, fungal, parasitic or toxic agents and can cause widespread morbidity and mortality in wildlife populations.

Wildlife contaminated by oil are exposed to stressors in the wild and in captivity that can lower their resistance to epizootic diseases. Animals undergoing rehabilitation are confined in close quarters where spread of disease can be extremely rapid.

In addition to causing sudden and high mortality within a rehabilitation facility, epizootic diseases can be introduced in geographic regions when a "rehabilitated" animal is released and serves as a carrier to wild populations.

There is a risk that release of diseased rehabilitated animals can cause massive die-offs resulting in more damage to wildlife populations than the oil spill itself. This issue will be addressed, in part, when trustees limit wildlife care to qualified wildlife responders.

III. WILDLIFE RESPONSE MANAGEMENT AND OVERSIGHT

Effective wildlife response to oil spills requires a team approach as specialists in government and the private sector lend their skills to the response efforts. Oversight of the response, however, rests with the trustees.

A. Trustee Authorization

Authority and guidance for wildlife response following oil spills is contained in two federal plans. The National Multi-agency Oil and Hazardous Materials Contingency Plan (NCP 1968) assigned certain tasks for emergency response to agencies with particular missions and expertise. Following the passage of the Oil Pollution Act of 1990 (OPA), work began on the development of the Fish and Wildlife and Sensitive Environment Plan to help fulfill OPA's mandate for "immediate and effective protection, rescue and rehabilitation of, and the minimization of risk of damage to, fish and wildlife resources and their habitat that are harmed or that may be jeopardized by a discharge".

Trustees are authorized to act on behalf of the public's interest in the protection of natural resources. The Department of the Interior has trustee responsibility for migratory birds under the Migratory Bird Treaty Act (16-USC 703-722) and for most threatened and endangered species under the Endangered Species Act (16 USC 1531-1544). The Department of the Interior also has trustee responsibility for sea otters, dugong, walrus and manatee under the Marine Mammal Protection Act (16 USC 1361-1407). The Department of the Interior is also a trustee for lands they manage in the public trust, such as the National Wildlife Refuges (administered by the DOI's U.S. Fish and Wildlife Service) and the National Seashores and Parks (administered by the DOI's National Park Service). The National Wildlife Refuges and National Parks are important wildlife habitat in coastal North Carolina and, as such, are identified in the Area Contingency Plan as Tier I protection priorities, warranting the highest level of protection in the event of a spill.

Trustee responsibility for other marine mammals (whales and seals) falls to the Department of Commerce, particularly the National Oceanic and Atmospheric Administration. The Department of Commerce and Department of the Interior share trustee responsibility for anadromous fish under the Anadromous Fish Conservation Act (16 USC 7571-757f). These two agencies also share trusteeship of threatened and endangered sea turtles.

State agencies have trustee responsibilities for other game and nongame species not listed above. States also may possess co-trustee responsibility for above-mentioned species. The State trustee for natural resources is the Secretary of the North Carolina Department of Environment, Health and Natural Resources (DEHNR); within DEHNR, the Secretary has designated the General Counsel as the day-to-day contact on trustee issues.

B. Oversight

Trustee responsibilities as listed in the North Carolina Oil Spill Contingency Plan (B-24) are clarified in Chart A, page 9.

1) Permit Requirements. Federal Regulation 50 CFR 21.11 prohibits the possession of any migratory bird, for any purpose, unless special permits have been issued for activities that show benefit to the migratory bird resource. A permit will be required from the North Carolina Wildlife Resources Commission's Nongame Section to collect or rehabilitate injured wildlife. Required permits from federal and state agencies should already be in place prior to collection, transportation, rehabilitation, or release of contaminated species. In special circumstances, permits can be obtained by the Qualified Wildlife Responder at the time of a spill.

2) Rehabilitation Care and Oversight. Care for contaminated wildlife can be contracted for by the Responsible Party, the OSC, or other federal and state agencies, as authorized. However, full authority regarding protection, rescue and rehabilitation of wildlife and fish should remain with the trustees.

Migratory birds are the species most often affected in oil spills. *In these cases, the U.S. Fish and Wildlife Service should serve as the lead agency for trustee response, coordinating with other trustees and providing oversight for the Qualified Wildlife Responder.*

The wildlife response notification list has been compiled by the lead trustee and includes all trustee agencies (Section IV).

Only Qualified Wildlife Responders should be utilized for an oil spill response, and should be identified by the trustees. Possession of a general wildlife rehabilitation permit does not indicate capabilities for oil spill response.

C. Qualified Wildlife Responders

Identifying Qualified Wildlife Responders. An effective wildlife rehabilitation effort for contaminated animals requires supervision by people with

demonstrated field experience in oil spill response. If an experienced oil spill management team is not overseeing the rescue program, the animals will die.

A Qualified Wildlife Responder for major oil spill response should be able to demonstrate previous oil spill experience and should be able to satisfactorily address the following concerns:

- 1) Waste Disposal. To qualify for oil spill response, wildlife organizations should have an understanding of (and protocols established to comply with) existing federal, state and municipal regulations for collection, handling and disposal of oily waste and other hazardous materials.
- 2) Rapid Response Capabilities. An organization with a permanent oil spill response facility should be capable of being fully operational within 8 hours. For remote spills, the Qualified Wildlife Responder should be able to establish a safe and functional emergency facility offsite within 72 hours of notification.
- 3) Accepted Protocols. The Qualified Wildlife Responder should have written protocols already in place that have been documented as effective in past oil spill response efforts. Wildlife rescue efforts are not a suitable forum for experimentation with unproven methods. Wildlife care should be restricted to treatment procedures that have proven effective. Euthanasia protocols should be discussed with the trustees.
- 4) Wildlife Disease Issues. The organization should have full-time staff veterinarians experienced in wildlife care and knowledgeable about wildlife diseases. The staff veterinarians should accept responsibility for issuing clean bills of health for each animal following pre-release examinations; identification of epizootic diseases should be a priority. Release protocols should be presented to and approved by the trustees.
- 5) Chain of Evidence. The organization should demonstrate familiarity with the interagency procedures for cataloging, storage and disposal of dead animals and maintaining chain of evidence.
- 6) Time Commitment. The Qualified Wildlife Responder should be capable of providing experienced, trained staff for the duration of the wildlife response. In major spills, this can entail many weeks or months of full-time effort.

- 7) **Safety.** It is critical that the lead organization document its capability to manage large numbers of volunteers and staff in a safe manner, to establish and operate a safe workplace, and to comply with all pertinent federal and state regulations.
- 8) **Compliance and Liability.** The organization should carry third party liability insurance of at least \$2,000,000. It should comply with federal employee laws; it should provide Workman's Compensation. Thorough training, including OSHA training, must be provided for all staff and volunteers.
- 9) **Financial Accountability.** Organizations which manage oiled wildlife response efforts should be able to demonstrate fiscal responsibility and accountability. The organization should have financial policies in place for recording all financial transactions, invoicing and paying monies in a timely manner and should be familiar with Oil Spill Liability Trust Fund reimbursement procedures.
- 10) **Business Orientation.** Is the organization incorporated as a non-profit corporation? Historically care and treatment of non-client-owned animals (wildlife) has been undertaken by not-for-profit organizations. For-profit businesses that rehabilitate oiled wildlife for financial gain represent a fundamental change in historical practices, priorities, and goals. The organization should be able to explain and support its fee structure.

Formal education and advanced degrees in biology, veterinary medicine, or other related academic fields cannot substitute for actual field experience. The Qualified Wildlife Responder application form provided in Appendix A should further assist trustees in determining the qualifications of wildlife response organizations. Many shipping companies and oil storage facilities have a wildlife rescue organization under contract as required by the Oil Pollution Act. It is recommended that any contracted responder be able to perform at a level commensurate with the guidance offered in this section.

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Wildlife Trustees in North Carolina include the agencies listed below; bureaus with technical expertise are also listed:

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| D. Additional Human Resources (Volunteers, Colleagues) | <u>U.S. Department of the Interior</u> |
| | U.S. Fish and Wildlife Service |
| | National Park Service |
| | <u>U.S. Department of Commerce</u> |
| | National Oceanic and Atmospheric Administration |
| | National Marine Fisheries Service |
| 1) Colleagues | <u>North Carolina Department of Environment, Health and Natural Resources</u> |
| | Division of Marine Fisheries |
| | Wildlife Resources Commission |
| | Natural Heritage Program |
| While most wildlife rehabilitators and veterinarians cannot make the commitment of time needed to develop the resources to respond to major oil spills, many rehabilitators, veterinarians, and staff and volunteers from nature organizations will be willing to serve in a limited capacity during spill response efforts. The Qualified Wildlife Responder, as the lead wildlife response organization, should be willing to identify each person's or organization's strengths and | <p>The Wildlife Trustees must:</p> <ul style="list-style-type: none"> Assess type and number of wildlife that may require rehabilitation based upon species, sensitivity, and availability of care facilities. Identify and work with Qualified Wildlife Responders to establish wildlife recovery and rehabilitation procedures upon species, location, availability of care facilities, and natural resource trustee relationships. Identify resource and logistics requirements to address hazing, capture, triage, care, transport, rehabilitation, and release of wildlife. Collect and coordinate information required to document natural resource damages. Direct, coordinate, and oversee wildlife recovery and transportation operations. Monitor central clearing point to direct recovery to appropriate rehabilitation facilities. Oversee management of rehabilitation facilities. Maintain evidence, tagging, and storage procedures for wildlife recovered. Report on wildlife recovery operations. |

incorporate them into the wildlife response. Teamwork is the solution to a successful oil spill response. The U.S. Fish and Wildlife Service in North Carolina has sponsored an apprenticeship workshop for wildlife rehabilitators, veterinarians and biologists. These professional colleagues have been trained to offer professional assistance (as volunteers or part-time staff) to a Qualified Wildlife Responder during major oil spills.

2) General Volunteers

In major spills, there may be two or three shifts per day, with each shift utilizing over 50 volunteer workers. Volunteers must be thoroughly trained, precisely scheduled for suitable tasks, and must be supervised at all times. Volunteers working within the facility should be at least 18 years old. Jobs for younger volunteers can be identified as minimal risk, out-of-facility tasks. There is a place for everyone in oiled wildlife response, but the safety of humans and the welfare of the animals must be the highest priorities, not the emotional needs of the people who want to help. Not every concerned person/group can be a lead organization in a spill response. Management by experienced personnel will minimize problems and strengthen teamwork. (See Wildlife Response Training, Section VII.) In a spill, very few people actually handle wildlife. However, many people are needed in support positions, such as cost tracking, procurement of supplies, construction of pools and holding pens, cleaning the facility, and similar tasks.

IV. NOTIFICATION

A. Trustee/Agency Notification -

When an oil spill impacts wildlife, or has the significant potential for impact, the State or Federal OSC shall immediately contact the North Carolina Wildlife Resources Commission and the U.S. Fish and Wildlife Service. Primary and alternate contact points for the agencies are listed below; only one contact per agency is necessary because the person initially contacted will notify other personnel in their agency, such as Law Enforcement staff and Refuge or Gamelands managers.

1) North Carolina Wildlife Resources Commission Contacts for Coastal Districts:

a. First Line Calls (Coast-wide)

Earl Gillis - Wildlife Management

Office / Home: 252-745-4533

(alert Qualified Wildlife Responder at this time so they may be on stand-by)

Kent Nelson - Inland Fisheries

Office / Home: 252-752-5425

b. Second Line Calls

WRC District 1 (Currituck, Camden, Pasquotank, Perquimans, Gates, Chowan, Hertford, Bertie, Martin, Washington, Tyrrell, Dare, and Hyde Counties)

David Rowe - Wildlife Management

Office / Home: 252-221-4053

Chad Thomas - Inland Fisheries

Office / Home: 252-335-4961

WRC District 2 (Beaufort, Pitt, Pamlico, Craven, Carteret, Onslow,

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Greene, Lenoir, Jones, Duplin, Pender, and New
Hanover Counties)

Robby Norville - Wildlife Management
Office / Home: 252-523-8540

Brad Hammers - Inland Fisheries
Office / Home: 252-939-1167

WRC District 4 (Brunswick, Columbus, Bladen, Robeson,
Cumberland, Sampson, Harnett, Hoke, and
Scotland Counties)

Tom Padgett - Wildlife Management
Office / Home: 910-645-4115

Keith Ashley - Inland Fisheries
Office / Home: 910-866-4250

c. Third Line Calls (Raleigh Office)

Wib Owen - Wildlife Management
Office: 919-733-7291
Home: 919-693-2799

Bob Curry - Inland Fisheries
Office: 919-733-3633
Home: 919-870-9761

d. Call toll-free number: 1-800-662-7137. The message will be relayed to Raleigh staff members and supervisory field personnel by the staff duty officer who is on duty 24 hours/day.

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2) U.S. Fish and Wildlife Service Contact Points (in order of priority to be contacted):

a. Contaminants Specialist (Tom Augspurger)
Ecological Services Office, Raleigh, NC
Office: 919-856-4520 x. 21
Fax: 919-856-4556
Home: 919-881-2569
e.mail: tom_augspurger@fws.gov
(alert Qualified Wildlife Responder at this time so that they may be on stand-by)

b. Alternate Field Contact (John Ellis)
Ecological Services Office, Raleigh, NC
Office: 919-856-4520 x. 26
Fax: 919-856-4556
Home: 919-851-3755

c. Regional Spill Response / Damage Assessment Coordinator
(Dr. Diane

Beeman)

Ecological Services, Atlanta, GA
Office: 404-679-7094
Fax: 404-679-7081
24 hr. SKYPAGER: 1-888-518-8424
Cellular phone: 404-895-7093

d. National Spill Coordinator (Ron Britton)
Division of Environmental Contaminants
Arlington, VA
Office: 703-358-2148
Fax: 703-358-1800
24 hr. SKYPAGER: 1-800-759-8888, PIN# 5072273

*Updated October 1999 by Tom Augspurger - USFWS

Upon notification of a spill, the following actions will be taken:

- 1) The Commission and Service will consult available reference material to determine significance of the resources in the impacted area.
- 2) The Commission and Service will jointly decide on further involvement of each agency based on severity of the spill and species impacted under each agency's respective responsibilities.
- 3) The Commission and Service will dispatch the most appropriate individual to inspect the spill site. Generally, the Commission's Supervisor for Coastal Areas will dispatch the appropriate District Biologist in the area of the spill for an initial on-site inspection. This could be a cooperative effort of the Commission and Service or a unilateral project determined at the time of the spill.
- 4) The State/Federal biologist on scene will contact the OSC, which in coastal waters is the U.S. Coast Guard representative and in inland waters is the EPA representative, and also will contact the area coordinator from the Department of Environmental Management to determine the identity, amount, and physical properties of the pollutant and the area affected. They will ask the OSC to determine if the responsible party has a pre-designated Qualified Wildlife Responder. The biologist will then determine as accurately as possible the numbers and species of mammals, birds, and fishes in the area and their susceptibility to the pollutant; identify key areas used by wildlife and inform the OSC and area coordinator of the importance of protecting these areas.
- 5) The biologist making the initial site inspection will determine the potential impact of the pollutant on mammals, birds, endangered species, and estuarine and anadromous fishes. They will contact their respective supervisors with an evaluation of the situation and recommendations for further involvement, actions to be taken by the OSC for protecting fish and wildlife resources, and cleanup operations required for affected species.
- 6) The Commission and Service will jointly decide on further involvement, recommendations to OSC for protecting fish and wildlife resources,

and cleanup operations of affected species.

- 7) The agencies may recommend that the spiller or OSC (in the case of an unknown or uncooperative responsible party) contract with a Qualified Wildlife Responder. The Qualified Wildlife Responder may be tasked with wildlife deterrence, collection, and treatment. In all cases where a Qualified Wildlife Responder is utilized, the agencies will maintain an oversight role. Oversight includes, but is not limited to ascertaining that appropriate permits are in order, supervision of deterrence, collection, handling, treatment, and release, review of record keeping practices, establishing chain of custody procedures, and dictating disposition of carcasses to labs and evidence storage.
- 8) The Commission has no staff dedicated to oiled wildlife rescue and rehabilitation. With the exception of the National Spill Coordinator and Regional Spill Response and Damage Assessment Coordinators, there are no Service staff funded for emergency planning and response. Therefore, the agencies will seek reimbursement from the responsible party or National Oil Spill Liability Trust Fund for expenses incurred in response. Reimbursements should cover salary, travel, per diem, overtime and equipment / supply expenditures. Accurate record keeping is required for any reimbursements. Depending on the level of involvement anticipated, the agencies should secure a pollution incident charge code and allocation from the OSC early in the event.
- 9) The Commission and Service will maintain the lead role in field assessment oversight of collection of dead and injured organisms, maintain chain of custody, and will ensure collection of scientifically and legally sound biological data and evidence.
- 10) Monitoring and response will be continued by the Service and Commission until the crisis and cleanup phases of the spill have been concluded and final recommendations have been made to the OSC.

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B. Schematic for Timely Response

SCHEMATIC FOR TIMELY RESPONSE

I. IDENTIFY WILDLIFE AT RISK (IF)

Species of Concern
Geographical Distribution
Seasonal Distribution

II. IDENTIFY IMMEDIATE SPILL CO CONSEQUENCES TO WILDLIFE

Mechanical (skimming, booms, dike
Chemical (dispersants, herding agents
Other (in situ burning)

III. IDENTIFY WILDLIFE PROTECTION

Field / Air Assessments for Wildlife
Dispersing Non-oiled Animals
Pre-emptive Capture and Relocation
Baiting Oiled Animals

IV. DETERMINE RESPONSE TO C

Search and Retrieval (dead and live
Field Care (stabilization)
Facility Set-up
Training of Volunteers / Personnel
Medical and Rehabilitative Care
Records and Chain of Evidence
Pre-release Health Checks and Evaluation
Release

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C. Drills/Exercises

In addition to the information provided in Annex D, Appendix II of the USCG Area Contingency Plan, it should be noted that the Qualified Wildlife Responder must be incorporated into all drills/exercises involving oil spill response situations which may potentially impact wildlife. Only by including the Qualified Wildlife Responder as part of the team will the OSC and the Field Response Coordinator (FRC) fully understand and appreciate the vital role that the rehabilitation specialist plays in the overall success of the response strategy. The Qualified Wildlife Responder should have experience in oiled wildlife identification, hazing protocols, search and rescue procedures, facility identification and set up, procurement of supplies, mobilization of stockpiled equipment, and the training of new volunteers. Since the majority of this work occurs in the first 24 - 36 hours of an incident, early involvement of the Qualified Wildlife Responder in drills and exercises is imperative. The Qualified Wildlife Responder should provide a daily end-of-day report to the incident commander, outlining all communication and response efforts made by the Qualified Wildlife Responder. This information should be incorporated into the daily drill documents. The Qualified Wildlife Responder participating in the drills/exercise should be included in the final critique of the drill/exercise to help ensure a complete and accurate assessment is made regarding the ability of all participants to respond to the wildlife at risk.

V. FIELD RESPONSE STRATEGIES

A. Field Assessment of Wildlife at Risk

Wildlife trustees should arrange for immediate field assessment following a spill, to determine habitat and species at risk. Protection of habitat is an immediate priority: the Area Contingency Plans' Sensitive Areas Annex (Annex E, Appendix V) defines important wildlife habitat including shoreline sensitivity. Field assessment should include approach by overflights, water and field, as appropriate; often a combination of approaches are necessary to provide a complete understanding of the wildlife and habitat at risk. Several references on the relative sensitivity / vulnerability of North Carolina's birds and marine mammals to oiling are available to assist in the response planning effort (Clapp et al. 1982a, 1982b, 1983; Lee and Socci 1989). Assessments should continue periodically throughout the spill response. Information collected from field work is combined with NOAA trajectory data to design strategies to prevent contamination and to arrange collection of

affected animals.

B. Preventing Wildlife Contamination

1) Hazing & Deterrents

a. Permit Requirements

All hazing operations will be overseen by the NC Wildlife Resources Commission and the USFWS. The clean-up contractors and / or Qualified Wildlife Responder will have primary responsibility for conducting these actions under the supervision of these agencies.

b. Equipment and Techniques

Hazing protocols need to be established as soon as possible after an oil spill to reduce the number of animals that may become contaminated. For any program to be effective, it must be well conceived, adequately manned, monitored, and properly equipped. Most successful protocols will require round-the-clock operation that alternate both the timing and the type of techniques used. No attempts should be made to disperse oiled wildlife. Appendix B provides a guide which should familiarize field personnel with the range of tools available for deterring non-oiled wildlife.

C. Search & Rescue

- 1) Permit Requirements. All search and rescue will be conducted by Qualified Wildlife Responders and contractors with oversight and supervision by the USFWS and NC Wildlife Resources Commission.

During an oil spill, rapid implementation of wildlife response strategies is crucial to the survival of the affected animals. It is better to utilize large numbers of field personnel doing assessment and collection early in the response; thirty people searching for three days would be more effective than three people for ten days. Search and rescue teams should be trained to recognize the behavior of oiled wildlife, to retrieve the affected animals and, especially, to understand the safety aspects of field retrieval. Teams should be assigned specific search locations and coordinated from one point to assure good communication and search coordination.

Search and rescue teams should have several objectives:

- Set up and implement a hazing program for uncontaminated animals;
 - Assess the location, numbers and species of wildlife at risk;
 - Assess and document the degree of oil contamination of animals and habitat; and,
 - Retrieve oil contaminated animals for rehabilitation and carcasses for federal evidence.
- 2) Field Safety. Human safety comes first in any response effort. The way to ensure this is via an incident-specific health and safety plan. The lives of the search and rescue teams should not be put at risk to collect oiled wildlife. To assure the safety of the personnel and increase efficiency of capture, two three-person teams should be used for field retrieval. Search and Rescue teams should be aware of the health concerns, including: exposure to contaminants; weather-related concerns such as hypothermia and hyperthermia; and field related injuries. For additional Health and Safety information see USCG, Area Contingency Plan, Annex H, Appendix VIII.
- 3) Signs of Oil Contamination. There is a golden period when oiled animals become weak enough to capture but are not too debilitated for successful treatment. It is vital to direct all retrieval efforts to this period.

One main sign of oiling is active grooming. The animal will be constantly trying to remove the contaminant from its feathers or fur. Preening is a good indication of oiling and can be observed in animals from a distance; oiled birds often are riding low in the water and appear to be struggling. Waterbirds slowly lose their ability to remain afloat in the water and head for shore.

- 4) Retrieval. Retrieval of animals in the water is extremely difficult. Beached animals should always be approached with the captor placing himself/herself between the animal and the water to prevent the animal from going back into the water where it may drown in an effort to avoid capture.

As the weather becomes colder, the winds pick up, or the oil-soaked animals feel more exposed to predators, they will attempt to hide in brush, under tussocks of grass or next to small boulders. Aerial surveys and casual ground surveys will not disclose these birds. Retrieval teams should walk slowly and observe carefully in areas where brush is thick.

Team members should fan out and approach slowly using the appropriate nets to trap the animal and prevent its escape. A towel or light blanket may be used to surround and pick up an oiled bird. For the safety of both the retrieval team and the animals, birds (especially those with sharp bills), should be carried at waist height, wrapped in a towel. Field retrieval personnel should wear personal protective equipment referenced in USCG Area Contingency Plan, Annex H, Appendix VIII.

- 5) Transport. As soon as possible after capture, each animal is placed in a well-ventilated cardboard box or other transport carrier. The box is put in a warm, quiet location and transported as soon as possible to the designated facility. Retrieval information should be recorded as the animals are picked up. The retrieval forms should be placed in or taped to the transport carrier. Each form should note the date, time and location of each pick-up and the name of the person who collected the animal. Transport vehicles for the live animals should be enclosed, well-ventilated and temperature-regulated to avoid extremes of hot or cold. Boxes should not be stacked. A collection point should be designated and regular pick-ups arranged for delivery to the rehabilitation facility.

There are a number of effective capture strategies; selection of a technique depends on the habitat, species and weather. The trustees and/or the Qualified Wildlife Responder should be familiar with all the techniques and equipment available to retrieve the animals effectively and to minimize the risk of injury.

D. Special Concerns - Nonavian Species

Avian species are the animals most frequently affected in the majority of oil spills. However, some terrestrial mammals, reptiles, and marine mammals are occasionally affected by oil contamination.

Marine fauna at risk to spills in the area should be identified. Protection and response strategies can be designed for species like sea turtles, who come on shore at predictable times and in predictable locations, or seals who will be on rookeries at predictable times. Protection of habitat would be the first priority in these instances.

Under the Marine Mammal Protection Act (MMPA), federal and state agencies may share responsibility for certain marine species. The National Marine Fisheries Service has, under this provision, authorized Marine Mammal

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Stranding Networks throughout coastal regions of the United States. Most marine mammal responses are to dead animals, however some members of the stranding networks have facilities that can be utilized in wildlife rehabilitation. The Qualified Wildlife Responder can work with these specialists, providing emergency care for oil contamination and turning the recovery care over to the marine specialists.

Expertise may vary, with some network members having experience with pinnipeds, and others with sea turtles.

Under the Marine Mammal Health and Stranding Response Act, a new Section was added to the MMPA requiring contingency planning and response efforts for unusual mortality events.

Capture, transportation, medical care, disease concerns and housing differ in the many species in these taxa. Different marine mammals have different trustees (see Sections III (A) and X). The existing stranding networks, facilities and specialists should be utilized for protection and rehabilitation of marine mammals in oil spills.

Trustee oversight and proper permits are required for response.

Appendix C lists the Marine Mammal Stranding Network members for the North Carolina region.

VI. FACILITY / EQUIPMENT NEEDS

Equipment and Supplies for Avian Species

The equipment lists in Appendices D and E are focused toward the majority of species affected by a petroleum discharge, which historically is avian. With only minor additions, the supplies and equipment listed will also accommodate terrestrial mammals and reptiles that may be encountered. This list does not include the supplies and equipment needed for sea mammals, large sea turtles and other non-avian aquatic species. The Marine Mammal Standing Network (see Appendix C) in North Carolina is better equipped to deal with follow-up care for these species. Facility and equipment requirements can vary significantly, depending on: overall size of response, the species and age of wildlife contaminated, the type of contaminant, the season/weather, the location of the spill, and the rehabilitation effort. The following information is provided to identify the range of equipment and supplies needed during an oil spill response. The actual quantity of materials needed will vary according to the needs of the specific spill situation, and should be determined by a Qualified Wildlife Responder experienced in oil spill response work.

Facility specifications and staging areas:

Facility

Because facility requirements can vary so significantly, a permanent facility is not always advisable, and may actually be an impediment in providing the appropriate facility design for the situation. A suitable facility must have a large open space on the ground floor that can be easily configured and reconfigured to accommodate the changing needs of this unique form of wildlife rehabilitation. The facility must have electricity and have access to large amounts of potable water. A warehouse, armory, motor pool, or convention hall, that is within reasonable distance from hotel accommodations, is accessible to a trained labor force, and has adequate parking and exterior grounds could meet this requirement. The facility may be located up to 3-4 hours from the spill site, provided that on-scene stabilization is administered prior to transport.

Staging areas

At present, Wilmington, and Morehead City, North Carolina have been identified as potential locations for temporary wildlife response facilities. (The Port Authority buildings in these cities should be considered as potential

treatment areas.) Both locations are close to a trained work force, have good hotel accommodations, are within reasonable commuting distances from potential high risk spill locations and have industrial areas with suitable structures for a wildlife response facility. A suitable site has not yet been identified for the northern portion of the state. It is recommended that a list be assembled of potential real estate within the two identified areas, and the sites be physically reviewed by a representative of a wildlife response group with major oil spill experience. Once actual facilities have been identified, all cost, availability and contact information should be noted and reviewed every six months.

Appendix D(1) identifies facilities that were targeted, after a preliminary search, as worthy of further evaluation. The information outlined in Appendix D(2) describes basic requirements for a suitable wildlife response facility. The actual site selection, design and management of the interior space (ie., operations control, cleaning, medical treatment, work areas, holding pens etc.) will vary with every spill situation, and should therefore be determined at the time of the incident, by a Qualified Wildlife Responder experienced in oil spill response work.

VII. WILDLIFE RESPONSE TRAINING

During an oil spill involving wildlife there is an immediate need for large numbers of trained volunteers to work with the Qualified Wildlife Responder.

A. Goals of Training

Advanced training for volunteers can:

- enhance the speed and quality of a response involving wildlife following an oil spill event;
- clarify the duties and the responsibilities of the spiller, clean-up contractor, state and federal agencies, volunteers and the general public;
- significantly improve the treatment and the release rates for affected animals;
- considerably reduce wildlife response cost by focussing efforts in a cost-effective manner; and,
- help to insure the safety of all those working in a wildlife response.

Worker training on the effects of oil on wildlife should include a general overview of the internal and external effects of oil on wildlife, current treatment protocols, facility needs and a special emphasis on human health and safety.

This training can be held for federal and state personnel, professional colleagues (veterinarians, licensed rehabilitators, and biologists), and general volunteers.

Volunteer Criteria

There are specific criteria for volunteers interested in assisting the Qualified Wildlife Responder following an oil spill involving wildlife. All volunteers must be at least 18 years of age, in good health and have a current tetanus toxoid inoculation. Pregnant women and immuno-compromised individuals should not work directly with wildlife. The Qualified Wildlife Responder/Trainer should require that a General Release of Liability Form be signed before volunteers are allowed to work on the response effort. Volunteers must be able to donate a minimum of three shifts, (5 - 6 hours long), within the first two weeks of the spill response.

B. Current Training - North Carolina

In September 1993, a two-day workshop was held in Beaufort, North Carolina, hosted by the United States Fish and Wildlife Service and the North

Carolina Wildlife Commission. Sixty-five attendees from the general public and governmental agencies were trained to work with the Qualified Wildlife Responder. Attendees to this workshop should receive an annual refresher course and additional annual workshops should be scheduled to train new volunteers. See Appendix F for a sample workshop agenda. Appendix G lists workshop attendees. In June, 1991 the field personnel from the USCG - MSO Wilmington were trained in a 1/2 day workshop on the effects of oil on wildlife and how to recognize oil contaminated wildlife in the field.

C. Future Training

Federal Trustees have identified the coastal areas of the state, (Morehead City and Wilmington), for future workshops; these areas present the greatest risk for contamination resulting from an oil spill.

VIII. HUMAN HEALTH & SAFETY

Most of the Health and Safety concerns encountered when responding to wildlife contaminated by oil spills are similar to those in other aspects of spill response. Contact with oil and oiled wildlife must be minimized through the use of proper protective equipment, ventilation and human hygiene. Field safety issues must also be considered, and have been addressed in the USCG Area Contingency Plan, Annex H.

A. OSHA Training for Personnel

All individuals, employees or volunteers, must receive minimum instruction in Health and Safety concerns, including: Right to Know issues (potential hazards of the spilled product); basic first aid and/or emergency notification instruction in case of exposure to the product; the use of proper protective equipment as advised for the spilled product, and; general hazards in working with wildlife, their prevention and treatment.

All team leaders in the wildlife response area must have at least 24 hours of OSHA training in order to anticipate and avoid safety problems, instruct other staff and volunteers of these potential hazards, and respond to any emergencies.

No individual who is immunocompromised (presently sick with an infectious disease, pregnant, on chemo-therapy, having a liver disease, having active AIDS or other immunocompromising diseases, etc.) should be allowed to work with petroleum-contaminated wildlife.

Access to and from any wildlife staging area or rehabilitation facility must be restricted to those individuals who have received the above training.

B. Site Safety

A site safety plan must be implemented as soon as the staging and/or rehabilitation facilities are established. The safety plan must include checklists for measures to avoid physical, chemical and biological hazards, and should contain emergency procedures and contact numbers.

General site safety guidelines addressed in the USCG Area Contingency Plan, Annex H also apply to wildlife rehabilitation operations.

C. Product Risks

Petroleum products, in, on and around wildlife may present a hazard to human health and safety. Various components in certain petroleum products can damage skin, conjunctivae of eyes, lungs if inhaled, or the gastrointestinal tract if inadvertently ingested. Chronic and/or prolonged exposure may cause damage to the central nervous system and some cancers, such as skin cancer and leukemia. Fetal defects have been documented in laboratory animals.

Protective measures to avoid and/or minimize exposure are the same as those addressed in USCG Area Contingency Plan, Annex H. Individual risk factors such as pregnancy or history of liver disease should be taken into consideration in allowing volunteers and staff to work in contaminated areas.

Personal hygiene must be stressed during the decontamination process (USCG Area Contingency Plan, Annex H).

D. Wildlife Risks

Specific human health and safety concerns in handling wildlife will vary with the species of animals involved, but some general considerations can be made.

All individuals who will be handling oiled wildlife must be trained in proper capture and restraint techniques. The head (beak or teeth) and feet (talons or claws) of most animals can cause serious injuries if the handler has received improper or incomplete training.

Protective eyewear should be worn when working with birds with long, pointed beaks, and towels (for entire body control); heavy canvas or kevlar gloves should be used to restrain feet of all birds.

Animals should be held at or below waist-height, away from human faces. At least two people should be present for any prolonged handling (examinations, washing, etc.). Aggressive mammals should be controlled with nets or snare poles, and should be sedated for any prolonged handling.

Any worker handling wildlife should have a current tetanus shot.

A first-aid kit should be on-site and visible.

E. Zoonoses

Unique to the wildlife aspect of an oil spill response is the potential hazard of zoonotic diseases, *i.e.*, diseases which can be transmitted from animals to humans. Of specific concern are the following diseases:

Birds:

Aspergillosis--a fungal disease causing respiratory problem in humans.

Chlamydiosis--a bacterial disease causing flu-like symptoms in people. Potentially fatal.

Salmonellosis--a bacterial disease causing diarrhea in humans.

Avian Tuberculosis--a bacterial disease causing skin lesions and occasionally respiratory problems in humans.

Histoplasmosis--a fungal disease causing pneumonia in humans.

Mammals:

Rabies--a viral disease causing central nervous system (CNS) disorder in humans. Fatal if untreated.

Giardia--a protozoal disease causing diarrhea.

Baylisascaris--a parasite causing CNS disorder & death in humans.

Campylobacteriosis--a bacteria causing diarrhea in humans.

Cryptosporidiosis--a protozoal disease causing diarrhea in humans.

Toxoplasmosis--a protozoal disease which may cause CNS disorder in humans.

And many others

Wearing gloves while cleaning animal cages and food bowls, washing hands with a disinfectant soap, wearing gloves and surgical mask while performing necropsies (post-mortem examinations), and providing for adequate room ventilation will help reduce the risk of contracting these diseases. Only individuals who have received prophylactic rabies vaccinations should handle wild mammals.

IX. HIGHLIGHTS OF WILDLIFE CARE

A. Medical Care

Retrieved oiled animals should be examined and receive initial medical treatment as quickly as possible. The initial treatment can be provided at a field station (staging facility) if the animal is more than one hour's drive from the main facility. If animals are retrieved within one hour's transport to the rehabilitation facility, initial treatment may be delayed until arrival at the facility.

Retrieved birds should be transported in well-ventilated cardboard boxes (not wire cages). Mammals should be placed in well-ventilated escape-proof and injury-proof containers. Animals should be transferred in enclosed, well-ventilated, temperature-controlled vehicles. If stabilization is delayed until arrival at the main facility, birds awaiting treatment should be placed in a warm, quiet, well-ventilated area away from people and noise.

The initial physical examination, performed at the staging site or main facility, begins with the identification of each animal through the use of numbered leg bands, ear tags, or other means, depending on species. An individual record must be kept on each animal; species and age should be clearly marked. During the physical exam, body weight and temperature are noted. The eyes are flushed, oil is removed from the mouth and nares or nostrils, and the vent or anus cleared of oil.

Supervision by an experienced wildlife veterinarian is necessary for evaluation of injuries or illnesses, the extent of the effects of oil on the animals, the degree of dehydration, the overall body condition, and any other medical findings. The information should be recorded and animals triaged based on such parameters as species, age, extent of injuries, and body temperature / weight ratio. Degree of oiling is not a determination in triage.

Initial stabilization involves an active regimen of rehydration and other medical procedures as necessary. Because of the harm to the birds from the internal and external effects of the oil, all efforts should be made to stabilize and wash the oiled animals within 24 - 48 hours. Protocols for medical care are described in detail in Appendix H, Section 3.

Oiled feather samples should be taken for fingerprinting. Oil should be swabbed from beaks, mouths, etc, for chemical fingerprinting.

Gross post mortem examinations can be performed at the treatment facility. Histologic studies will require more time and are usually done in special laboratories. The trustees will require that a majority of dead animals be maintained in chain of evidence for NRDA purposes. USFWS Law Enforcement agents and the National Wildlife Health Center in Madison, Wisconsin will oversee this process.

The information obtained from post mortem examinations can assist in: determining treatment protocols of live birds and discovering disease processes. Some of the dead birds should receive immediate post mortem examinations to aid in the rehabilitation efforts. Post mortem information may be litigation sensitive and should not be released without approval of the natural resource trustees.

B. Cleaning

Oil contamination disrupts the intricate, complex interlocking network within feathers, limiting or destroying a bird's ability to fly, thermoregulate and remain waterproof. To restore the waterproofing and insulating properties, oil and detergent must be removed from the feathers without damaging the delicate feather structure.

Oiled birds cannot be washed unless large amounts of hot water are available. At least 80 - 100 gallons of 103° - 105° F water are needed over a forty-five minute period to wash and rinse one duck. This volume of hot water can only be assured with industrial hot water heaters. The water must be above 102° F in order to lift the oil, but water over 105° F can harm the bird. Note: Certain arctic and holartic species (e.g., penguins) can overheat, and special techniques are required for these animals.

The cleaning agent must be non-irritating to both animals and humans; it must also be able to lift and maintain the oil in suspension. It must rinse quickly and completely from the feathers. Very few cleaning agents meet these criteria. The actual process of removing the oil and the cleaning agent from the feathers is a detailed process described in Appendix H, Section 4. Please see Chart B, page 50 for an outline of oiled bird rehabilitation procedures.

C. Husbandry

During the entire rehabilitation process, from the time of capture to the day of

release, proper husbandry (housing and nutrition) must be provided for all species. There is potential for a great variety of different species of birds, mammals, reptiles and amphibians to be contaminated following an oil spill.

Husbandry needs may vary greatly from one species to another. All husbandry procedures, especially those pertaining to diet and the animal's behavior, should be recorded daily. Observation and reporting of any abnormalities such as inappetence, shivering, lethargy, etc. is vital for adjusting the care being given and thus for successful rehabilitation.

The most important factor in the rehabilitation process is the reduction of stress and all sources of stressful stimuli. Stress reduction is accomplished mainly through two objectives: 1) minimizing any unusual inputs to the animal's senses (sights, sounds, smells, etc.); and 2) maximizing any simulation of the animal's natural environment.

Housing can vary greatly with each species and can range from soft-sided baby playpens to large enclosures and pools. Substrates and perches must be appropriate for the species being housed. All housing should meet the *Minimum Standards for Wildlife Rehabilitation* (published by the National Wildlife Rehabilitators' Association and International Wildlife Rehabilitation Council, 1994). All housing must be cleaned at least twice daily. Cages / housing should be disinfected between use by different animals. (Procedures are described in *Minimum Standards for Wildlife Rehabilitation*.) Other considerations for rehabilitation include ventilation, swimming opportunities, rehydration fluids, nutritionally complete diets, the role of salt water in seabirds, and secondary (captive-related) problems. Wildlife rehabilitation procedures are described in more detail in Appendix H, Section 5.

All pre-release medical examinations should be performed by an experienced wildlife veterinarian. This exam includes weighing the animal, evaluating body condition, a strict protocol to ensure waterproofing, examining for the presence of infectious disease, determining that all injuries have resolved, and ascertaining that blood values fall within the normal range. The observations should indicate that animal can function normally and survive in the wild. A USFWS band should be placed on all birds prior to release. Releases must take place in suitable habitat free from contamination, with adequate natural food sources for that species. When large numbers of animals are being prepared for release, the release procedures must be carefully planned and managed; this is the only way to ensure that animals are not held in transport containers for prolonged periods of time. Risks faced during confinement include over-heating, lack of ventilation, fecal

contamination of (and thus destruction of water-proofing of) feathers, and traumatic injury. Delay during release procedures can cause needless fatalities. The release should take place in the first part of the day (for diurnal species) to allow the animal time to adjust to the location before nightfall. The release team should observe the animals after release to determine that the animals are behaving normally. The site should be revisited after 24 and 72 hours to monitor released birds. If animals are to be released before all oil is removed, especially from their capture area, they should be marked for easy identification. Use either rodamine to paint feathers or a non-toxic acrylic paint to mark bills/beaks. Make sure these markings are unique for the incident by coordinating with the National Bird Banding Lab at the Patuxent Wildlife Research Center in Laurel, MD.

D. Reporting

The Qualified Wildlife Responder will be responsible for providing daily reports to the FOSC on the number of wildlife received for treatment and their status. Reports of the number of animals retrieved dead, the number cleaned and any released should be provided so that the FOSC may pass this information on to the public affairs staff of the incident. The public affairs staff of the incident will handle all requests for information on the status of the wildlife response effort, including any necessary press releases.

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CHART B
OILED BIRD REHABILITATION PROCEDURES

X.. NATURAL RESOURCE DAMAGE ASSESSMENT

Natural Resource Damage Assessment has as its primary goal the restoration of the resource damaged. NRDA is not a punitive process. Costs can include the total value of past injury, lost services, restoration costs, residual injury, and administration costs.

A. Authority for NRDA

Authority for NRDA claims is contained in 3 statutes:

- 1) Comprehensive Emergency Response, Compensation and Liability Act (CERCLA)
- 2) Clean Water Act (CWA)
- 3) The Oil Pollution Act (OPA'90).

CERCLA requires that Resource Trustees recover damages for loss or injury to resources from discharge of oil or release of hazardous substances.

B. Natural Resources (as defined by CERCLA):

Land

Air

Fish

Water

Ground water

Drinking water supplies

Wildlife

Biota

and other resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by, the United States, any state or local government or any Indian tribe.

C. Natural Resource Trustees

Trustees are the government officials designated to act on behalf of the public's interest for the protection of natural resources. The Department of Interior, the Departments of Commerce, Agriculture, Defense, and Energy, and Native American tribes are identified in *Executive Order 12580 - Superfund Implementation* and listed in subpart G of the National Contingency Plan.

Some Trust Jurisdictions

Department of the Interior: Migratory birds, some anadromous fish, species protected by the Endangered Species Act and their supporting habitats, and all natural resources within National Parks and National Wildlife Refuges

Department of Commerce / National Oceanic Atmospheric Administration (NOAA): Anadromous and marine fish, some species protected by the Endangered Species Act

Department of Agriculture: National Forests

Depts. of Defense and Energy: Resources on their lands

Native Americans: Tribal lands, treaty rights

States: A wide variety of resources

Trustees are expected to develop partnerships and work cooperatively in NRDA. This avoids double counting for Trust Resources, pools efforts and expertise, and can result in a single legal action. Trustee partnerships should be formalized by MOU, Memorandum of Agreement (MOA), or Interagency Agreement (IAG). Trustees should request monies to initiate damage assessment through the FOSC and must decide on which trustee will act as the Lead Administrative Trustee before the request is processed.

USFWS as a technical representative of the DOI's Trusteeship:

- 1) Identify immediate resources at risk
- 2) Prevent impacts to wildlife / resources
- 3) Provide technical assistance to OSC
- 4) Oversee wildlife collection, rehabilitation, release
- 5) Oversee chain of evidence
- 6) Document damage to resources and services
- 7) Develop damage claim and restoration / compensation settlement

D. Responsible Party Obligations

Trustee may expect the responsible party to take responsibility for all aspects of natural resource response; there is not an either/or option.

Prevent Damage to Resources

Clean up Contaminant

Restore Resources (Wildlife, Habitat, etc.)

Responsible parties vary in their involvement from full participation in each step to financial reparation.

- 1) Responsible parties should acknowledge trustee responsibilities
- 2) Responsible parties should acknowledge impact to resources
- 3) Responsible parties should understand basics of NRDA
- 4) Responsible parties should show willingness to cooperate
- 5) Responsible parties should have technical expertise available

Responsible Parties Have the Right to Expect:

- 1) Trustees to invite Responsible party participation early in the process
- 2) That Trustees will coordinate with Responsible party efforts
- 3) That multiple trustees work as a team
- 4) That trustees can develop a letter of agreement
- 5) That trustees focus on restoration / compensation.

A copy of the NRDA Assessment Process, as proposed under OPA 1990, is presented in Chart C, page 37.

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CHART C
**NATURAL RESOURCES DAMAGE ASSESSMENT PROCESS
PROPOSED RULE UNDER OPA 1990**

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APPENDICES

APPENDIX A WILDLIFE RESPONSE APPLICATION

Our office would like to ensure rapid, effective response for wildlife threatened by oil spills. Because we know that wildlife rehabilitation after major oil spills is a complex job, requiring a multi-disciplined staff with documented oil spill experience, we request that all organizations wishing to be considered for wildlife response work complete the following questionnaire.

ORGANIZATION

PHONE

ADDRESS

ZIP

DATE FOUNDED _____ YEARS OF OIL SPILL EXPERIENCE

FEDERAL/STATE _____ PERMIT _____ INFORMATION _____

1. MAJOR SPILL EXPERIENCE (Please list name/date of spill, type and amount of oil, species affected, your organization's role in spill, success of effort, reference names/telephone numbers.)

1)

2)

3)

APPENDIX A
WILDLIFE RESPONSE APPLICATION, pg. 2

2. OIL SPILL RESPONSE STAFF

A) Name _____ Full/Part-Time

Permanent _____ or Temporary Staff _____ Years on staff

Oil Spill Response qualifications and experience

OSHA trained on _____ (Date) Presented by whom

B) Name _____ Full/Part-Time

Permanent _____ or Temporary Staff _____ Years on staff

Oil Spill Response qualifications and experience

OSHA trained on _____ (Date) Presented by whom

C) Name _____ Full/Part-Time

Permanent _____ or Temporary Staff _____ Years on staff

Oil Spill Response qualifications and experience

OSHA trained on _____ (Date) Presented by whom

D) Name _____ Full/Part-Time

Permanent _____ or Temporary Staff _____ Years on staff

Oil Spill Response qualifications and experience

OSHA trained on _____ (Date) Presented by whom

Is one of the above a licensed wildlife veterinarian?

APPENDIX A
WILDLIFE RESPONSE APPLICATION, pg. 3

3. PROFESSIONAL KNOWLEDGE: Please attach a list of scientific publications and research completed in this field.

4. HUMAN SAFETY/LIABILITY:

A. Does your organization carry liability insurance?
____ Amount \$ _____ Type _____ Carrier: _____
Policy _____

B. Please attach a description of your safety training programs for volunteers and paid staff.

5. COMMITMENT OF SERVICES: Many oil spill responses require extended or remote response. Is your staff prepared to travel to respond to spills?

Yes _____ No _____ Regionally only _____

Is your staff able to commit to oil spill response for one month or more, if necessary?

Yes _____ No _____ Month Only _____ Guarantee duration _____

6. Facility: If you are applying for regional oil spill response, do you have a permanent facility? yes / no

Is it operational full-time _____ only during spills _____? Please attach information on size, type of facility, outdoor housing and pools, insurance, policies for regulatory compliance (waste water disposal, etc.)

7. TERMS: Please attach copies of the following: Extent of services; Terms and Conditions; Sample Contract.

8. 24-HOUR NOTIFICATION: Please list your procedures and telephone numbers for 24-hour notification.

I certify to the best of my knowledge that all the statements made herein are accurate and true.

Signed _____ Date _____

Title _____

Return to:

Permission to reprint granted; we urge industry and government agencies to include all the questions listed in this application form. Tri-State Bird Rescue & Research, Inc., 1992.

Appendix B - Hazing and Deterrence Procedures

This material has been reproduced from:

Rehabilitation Manual for Oiled Birds
Richard D. Greer and Dennis J. Acinar
Exxon Biomedical Sciences, Inc.

and

Lynne Frink and Sallie Welte
Tri-State Bird Rescue & Research, Inc.
Newark, DE
October 1994

Hazing programs should consider the potential effects of human activity and disturbance on sensitive habitats and species. Trampling of fragile vegetation such as salt marsh grasses by human patrols or off-road vehicles should be minimized. In addition, the wakes of boats used for hazing may force surface oil further into marshes, and increase the area of contamination. If hazing is effective, but alternate habitats are not available, some migrating birds may not survive due to lack of food or other environmental factors. Migrating birds may have a strong tendency to return to contaminated staging areas. During the nesting season, the potential effects of hazing on bird reproduction must be recognized. Disturbance of breeding areas, e.g., eagle nests or waterbird colonies, should be avoided. Decisions are the most difficult when attempting to deter birds near a breeding colony, for the death of adult birds is more of a threat to many seabird populations than the loss of young birds.

If adult waterbirds are separated from their young, the susceptibility of the young to predation will be increased. Finally, the hazard of ignition of vegetation or spilled oil when using propane exploders or pyrotechnics must always be recognized.

Gas-operated Exploders

Gas or propane cannons produce a loud explosion from the ignition of propane gas that exceeds the blast of a 12-gauge shotgun. The interval between explosions, blast intensity, and period of operation can be manually adjusted. The use of multiple exploders in an area is much more effective than a single unit. If multiple exploders are used, the firing intervals should be staggered. Best results are achieved if exploders are moved to different areas every one to four days. Relocating the exploder 50 -60 feet (15 - 18 m) is probably sufficient in areas with high usage by birds. Exploders are more effective for migrating and hunted species (e.g., waterfowl) that associated danger with loud noises, and less effective for resident species that are well established in an area.

Pyrotechnics

These devices frighten birds by producing an explosion and/or flash of light. Types include

shotgun launched projectiles (shell crackers), and a variety of pistol launched projectiles. When using pyrotechnics, the danger of igniting spilled oil and vegetation must always be considered. Both shotgun and pistol launched devices should be fired with the wind, and away from personnel. Safety goggles and ear protectors (muff or ear plug type) must be worn, and personnel using firearms should be trained in firearm safety.

Shell crackers scare cartridges are fired from a 12 gauge shotgun. The shot in the shell has been replaced with a bulldog or M-80 firecracker that explodes at 100 - 150 yards (91 - 136 m). Single barrel shotguns which break and load at the breech are recommended. The barrel should be either cylinder, skeet, or improved cylinder chock to avoid possible jamming or premature ignition of explosion in the barrel (Ward 1977). Modified or full choke barrels should be shortened by several inches to remove any constrictions. However, the barrel length must be at least 48 cm (19 in) under federal law in the United States. For a pump shotgun, the use of more than one shell cracker could cause premature firing of the second shell during ejection of the spent shell (Ward 1977).

Shell crackers should be fired at a 45 degree angle to explode as close to the birds as possible. The shotgun should be fired from the hip for eye protection. Because of the light charge, the shotgun has only a slight recoil.

Pistol launched projectiles include noise bombs, bird bombs, and bird bomb rockets that explode after launching; whereas whistling bombs, bird whistles, and racket bombs make hissing or whistling noises as they travel through the air. Noise bombs and whistle bombs are fired from 15mm flare pistols, and bird bombs are fired from 6mm blank pistols. The range of these projectiles is 35 to 75 yards (32 - 69 m) (Salmon and Conte 1981). Stick or bird bomb rockets are fired from a 15mm pistol using a 22 caliber starter cartridge as propellant, and have a range of 69-73m (75 to 80 yd.).

Because whistle-type projectiles do not explode, they are considered less effective than shell crackers or bird bombs for some species (Booth 1983). However, they are highly effective if used in combination with exploding projectiles (Marsh et al. 1991). Pyrotechnic pistols also include a M-8 Verrey pistol with a steel sleeve insert that modifies the gun to a 12-gauge size (Farraro and DeFusco 1987).

Aircraft

Aircraft, especially helicopters, are effective deterrent techniques because of the combination of loud noise and rapid approach from above. They are often effective for hazing birds from large areas. Helicopters may also be used to herd flightless birds (young and molting birds).

Aircraft are considered to be especially useful during the early stages of cleanup and hazing operations. They are more effective if used in combination with other devices such as shell crackers and propane cannons. Because of their maneuverability and noise, helicopters are probably more effective than fixed-wing aircraft.

Boats

In addition to providing transportation for human patrols, airboats or boats propelled by outboard motors are effective for hazing waterbirds. Small, noisy, shallow-draft aluminum boats are particularly effective, and can be used as platforms for shell crackers during the day, and propane exploders and bright lights at night. Although labor intensive and probably ineffective for diving birds, boats may be used for herding young or molting waterfowl that are incapable of flight.

All Terrain Vehicles

All Terrain Vehicles (ATV) such as quadrunners are moderately effective for hazing many species of waterfowl and shorebirds. Human presence reinforces the effects of the noise and rapid movement of the vehicle. A quadrunner can also be equipped with airhorns or sirens, or used with pyrotechnics.

Biosonics

These techniques use distress, warning, or alarm calls that are broadcast by tape players to disperse individual or closely related species from the immediate area. In general, individuals or small flocks are less responsive than large flocks. The effectiveness of biosonics can be increased by supplementation with frightening devices such as shell crackers or racket bombs.

Av-Alarm®

This device broadcasts loud, intermittent, electronically synthesized sounds. The sounds produced are in the audible range and resemble the noisy chirping of a flock of birds. The unit can be adjusted to determine the most effective range of sound patterns for the target bird species, and sound patterns within this range can be varied over time to decrease habituation. Although often effective for deterring starlings and blackbirds, the Av-Alarm® has shown only limited effectiveness for hazing seabirds, gulls, and cormorants. Av-alarms® can be positioned on land, or mounted on boats or anchored floats in the water.

Air Horns

Air-produced or electronic, nonspecific, loud sound devices are probably effective for hazing birds from small areas or when used in combination with other deterrent methods. Ear protection is required when using these devices.

Balloons

All-weather helium balloons are considered effective if properly maintained and frequently refilled and moved. These balloons are 20 - 30 inches (50 - 75 cm) in diameter. They should

not be fully inflated in order to reduce stress from wind resistance. Balloons may be suspended from land or from a floating object in the water. They should not be located near trees or other objects that could cause puncturing. They should be tethered on 40 - 75 feet (12 - 23 m) of 48 lb (22 kg) or stronger monofilament line and initially spaced at least every 191 yards (175 m). Some balloons should be set very high to deter birds from flying overhead.

Human Effigies and Predator Models

Human effigies (e.g. traditional scarecrows) and raptor models may be effective if they appear lifelike, have motion, and are used in combination with loud sounds or recorded distress calls, and are moved frequently. However, birds rapidly habituate to predator models such as stationary owl decoys.

Flags

Flags are considered an effective and inexpensive hazing technique for waterfowl. They can be constructed of a three by two foot (91 - 61 cm) sheet of 3-mil thick black plastic mounted to a four foot (1.2 m) stake. The flags should be attached to stakes driven into the ground at an angle so they will move in light wind. They should be erected every 100 to 200 feet (30 - 61 m) on land, or on buoys over water. Mylar car dealership flags can also be effective for hazing waterfowl. Flags can also be used in conjunction with propane exploders.

Reflectors, Mirrors, and Reflecting Tape

Reflector devices can be constructed of aluminum or tinfoil pie plates with highly reflective surfaces that are suspended from a line over water or land. These devices can be used in association with lights and have been used to haze waterfowl. Hand held mirrors which reflect sunlight may also be effective. Mylar reflecting tape is another deterrent device for many species of birds. This silver and red coated tape is generally twisted and strung between support posts. The tape reflects sunlight, and vibrates under windy conditions producing a humming noise.

Lights

Strobe, barricade, search, and revolving fixed lights have been used to haze birds, and they should be combined with other deterrent techniques. Although search lights are partially effective for deterring feeding and flying waterfowl during the night, some bird species may be attracted to lights, especially during rain, fog, and heavy cloud cover.

Trained Falcons and Hawks

Falconry, which may be used to haze birds during non-windy, fair days, requires extensive animal care, training, and may require permitting. Because most waterbirds respond to falcons by landing on the water and/or diving, use of this technique may actually increase the potential for contact with spilled oil. In addition, some raptors (e.g., Peregrine falcons) will not

attack sitting birds, thus target birds may have to be flushed with other hazing techniques. In general, supplemental hazing techniques will be required when hazing birds with raptors. The risk of oiling the trained raptor must always be considered.

Lure Areas and Bait Stations

Birds may be lured from one area to another with the use of food. However, bait stations require that large quantities of grain are available over a period of days. Because lure areas must be established relatively close to a spill so that the food can be detected, this proximity may increase the oiling risk to birds attracted into the general area. Lure areas are recommended only when, after careful evaluation, alternative techniques would be expected to be ineffective.

Preparedness. In many cases, the necessary equipment is not available and Division staff is not familiar with the use of this equipment. A survey should be conducted to assess what types of deterrence equipment is available, the number of individuals trained in its use, what type of training program needs to be developed, and what equipment needs to be purchased. USDA Animal Damage Control may be able to assist in training efforts. The use of deterrents is one area where new techniques should be researched and the effectiveness of current methods tested.

Habitat Specific Techniques

The following habitat guide should assist field personnel in the most effective use of the various tools and techniques needed to deter non-oiled wildlife.

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Waterbird Deterrent Techniques

Marine Spill Response Corporation

Technical Report Series 94-003

Richard D. Greer, Ph.D.

Dennis J. O'Connor, Ph.D.

Ponds and Small Lakes

Although deterrence of birds from ponds and small lakes can be relatively successful, these habitats are seldom an oil spill hazard for large numbers of birds. Ward (1977) suggested that a combination of shell crackers and mortars could be used to disperse birds on water bodies with a maximum diameter of approximately 1.6 km (1 mi). Areas not accessible from the shoreline could be reached with a motorboat. Aircraft may be used to rapidly haze birds on larger lakes. To prevent the return of dispersed birds, devices that are not species-specific such as propane exploders and revolving or flashing lights could be established. If only a few species of concern are in the area, species-specific distress or alarm calls and possibly "crucified" birds may be effective (Ward 1977).

The effectiveness of hazing on shorebirds and waterfowl at agricultural evaporation ponds in California was experimentally tested (Salmon and Marsh 1991). In one experiment, All Terrain Vehicles (ATV'S) and cracker shells reduced waterfowl and shorebird abundance by 61.5% and 68.1% respectively, although weekly fluctuations in birds abundance necessitated caution in the interpretation of the data. Waterfowl were generally more responsive to hazing than shorebirds. However, hazing was not as successful for ruddy ducks and diving ducks, and during windy days. In another test using propane exploders, some species of shorebirds decreased in numbers, but sandpipers did not. Waterfowl abundance was too low to draw firm conclusions. Finally, birds were hazed with human patrols firing Cracker shells from ATV's equipped with air horns, and human patrols using cracker shells and propane exploders. Results showed that effectiveness varied widely among species and bird groups. The quadrunner patrol caused a 56% reduction in waterfowl (dabbler duck, diving duck, coot, and grebe) numbers, and the quadrunner patrol plus exploders caused a 93% reduction of the waterfowl group. The effectiveness of the deterrent strategies for reducing shorebirds also varied among species, but reduction in numbers was less than that for waterfowl. Overall, the quadrunner patrols caused a 67% reduction in the five major shorebird species or species groups, and the quadrunner patrols plus the propane exploders caused a 44% reduction.

In northern Alberta, a bird-scaring raft developed by Syncrude Canada Ltd. was tested for effectiveness on seven lakes ranging in size from 0.21-7.95 sq km (.08-3.07 mi) (Ward 1978). Mounted on each raft were a propane exploder and an orange kite-like scarecrow that was 2 m (6.6 ft) high and moved erratically in the wind (Yonge 1979). These rafts were effective for deterring *Aythya* spp., especially lesser scaup, and dabbling ducks, but not for grebes, buffleheads, and American coots. Results indicated that most waterfowl could be excluded from areas with rafts at densities of 2-4 per sq km (.39 sq mi). These rafts were considered less effective for other species groups such as shorebirds (Sharp 1987).

A model avian predator (*i.e.*, falcon), reflector device, and human effigy were tested for efficiency in deterring waterfowl from natural and polluted ponds in Alberta (Boag and Lewin 1980). The model falcon was secured to the end of a pole. The reflector was composed of aluminum pie plates attached to a revolving rectangular clothesline. The human effigy was a commercial manikin clothed in bright orange and yellow fabric. Only the human effigy appeared to be an effective deterrence device, especially for diving ducks (*Aythya*). In another test, they showed that human effigies caused a reduction in the numbers of waterfowl and shorebirds at a tailings pond.

Marshes and Wetlands

Methods used for ponds and small lakes are generally applicable to marshes, although birds in emergent marsh vegetation are less conspicuous and less likely to take flight (Ward 1977). Thus, increased emphasis could be placed in hazing with aircraft. Birds should not be disturbed if located in vegetation that is of sufficient density to prevent penetration by oil. If marshes are scarce locally and if transient birds are not common, lure areas could be established in nearby suitable marshes. However, if other suitable marshes are located nearby or if transient birds are abundant, lure areas could increase spill mortality by attracting

birds into the general area of the spill. Lure areas are recommended only when, after careful evaluation, alternative techniques would be considered ineffective. A greater density of pyrotechnics, exploders, and flashing or revolving lights would be required in a marsh than on a pond or small lake because of the difficulty in excluding birds from roosts during the night. These devices could also be supplemented with numerous scarecrows and reflectors (Ward 1977).

For oil spills in Texas salt marshes, airboats and helicopters are initially recommended for hazing waterbirds. Once the birds are flushed after two to three hours of hazing, propane cannons are deployed. These cannons are generally effective during the first day, and will often exclude birds from contaminated roost and loafing areas during the first night, thus modifying roosting pattern. Propane cannons are effective for shorebirds, ducks, gulls, and black skimmers. Shell crackers and screamer shells are used near beaches, and the hazing patrols themselves are effective deterrents. Boats may be useful if their wakes do not increase the contaminated area by pushing oil higher into the vegetation. Although birds will habituate to balloons, they may also be effective near rookeries (Brian Cain, pers. comm. 1993).

Lehoux (1990) evaluated the effectiveness of a variety of deterrents techniques in a maritime estuary of the St. Lawrence River, Quebec, Canada. Helicopter, motorboat (*i.e.*, Zodiac), three-wheel craft (*i.e.*, ATV), explosive rounds from pistols, and propane guns were used to haze waterfowl including snow geese, Canada geese, surface-feeding ducks, and scoters. When approached by the boat with occupants firing explosive rounds from pistols, scoter immediately began diving. After several minutes of harassment, scoters scattered in small groups in all directions. Although scoters departed the study area after an hour of harassment and remained absent two and a half hours later, they returned the next day.

In a closed bay, a series of explosive rounds were fired from the shore to deter scoters, eiders, and oldsquaw. The rounds drove the birds more than 1 km (.62 mi) from the shore, but after each series, the birds returned within hours. Thus, the radius of effectiveness for this techniques was approximately 1 km (.62 mi) for a two hour period (Lehoux 1990a).

Propane exploders were tested for two days in a 120-hectare (0.46 sq mi) *Spartina* marsh inhabited by surface-feeding ducks (80%), Canada geese (10%), and the remainder being gulls, herons, and mergansers. The exploders reduced the bird abundance by 50% to 80%, and the displaced birds gathered at the edge of the sea. During the test, few birds were observed within .75 km (.47 mi) of the exploders, but 20 hours after the termination of the test, the birds returned to their pre-test distribution. The radius of effectiveness for the propane exploders was approximately 30 to 40 ha (74-99 acres) (Lehoux 1990a).

In a 24-hr test for deterring waterfowl from a 49-ha (120 acre) marsh, helicopter flights reduced the waterfowl numbers from 600 to 300 birds. Almost all the remaining birds were chased from the areas with a three-wheel vehicle and explosive rounds. Propane cannons were set up for evening hazing, and the following morning only 40 birds remained in the area. Greater snow geese and Canada geese responded more readily to deterrent devices than surface-feeding ducks such as black duck and pintail, and teal were difficult to haze (Lehoux

1990a).

Lehoux and Cossette (1991) stated that helicopters were extremely useful deterrence devices because they can rapidly cover expansive areas, and can reach areas inaccessible from the shore. However, if helicopters are not consistently available, previously deterred birds may return to the site. During severe weather and the evening, helicopter use also will be limited. Finally helicopters may be relatively ineffective hazing bird species that tend to dive rather than take flight in response to overhead disturbances (e.g., loons and alcids). If birds are inside or near the perimeter of an oil spill, a helicopter should be reserved exclusively for hazing and additional deterrent techniques should be deployed as discussed below. These supplementary devices should be able to protect approximately 10 km (6.2 mi) of shoreline, be operational day and night, and be deployed so as to minimize the potential for habituation. The effective period for any device is generally less than three days.

Lehoux and Cossette (1991) recommended the following equipment based on experiences from seven oil spills: three propane guns, four 9.0 l (20lb) propane tanks, six pistols, 600 explosive rounds, 100 scarecrows consisting of plastic bags and aluminum plates, and a motorboat. Installation of a deterrent device required approximately 15 minutes. Six workers should be initially dedicated to installation of all the devices if the spill is of sufficient size. Subsequently, three workers will be sufficient to patrol and monitor the operation of the devices.

For hazing waterbirds in wetlands, the following deterrent methods were recommended (Lehoux 1990a, and Lehoux and Cossette 1991):

- low altitude helicopter flights at all hours are especially useful for hazing snow geese, Canada geese, and barnacle geese.
- if helicopters are not available, or species other than geese are abundant, a three-wheel craft (ATV) and explosive rounds are recommended. A single craft will be able to patrol at least 100 to 200 ha (247-494 acres) of marsh. The wetland should be frequently patrolled at all hours in a systematic pattern, even if few birds are observed. Although this strategy may be ineffective in bulrush-type marshes with high sedimentation, explosive rounds alone may give satisfactory results, especially for marshes not exceeding 1 km (0.62 mi) in length. Scarecrows should be constructed by placing plastic bags at the ends of 2-2.5 m (6.6-8.2 ft) rods that are erected at least every 100 m (328 ft). Six to eight aluminum pie plates can also be strung from a nylon rope between two metal stakes.
- propane exploders should be used throughout the evening with each exploder protecting 25050 ha (62-123 acres) or a radius of 0.5-0.75 km (0.31-0.47 mi). Detonation frequency should be set at every two minutes. Exploders should be installed on small rafts anchored offshore in areas with significant tides.
- deterrent devices should be established primarily in areas of highest spill

contamination. Because the presence of clean up workers is relatively effective in deterring birds, the use of three-wheel craft and explosive rounds may be reduced in areas with high human activity.

A mini-hovercraft could be used both as a deterrent device, and supply vessel to distribute and collect alarm buoys. A 5 m (16 ft) hovercraft, accommodating six people in addition to the operator, can maneuver on a 0.6 m (2 ft) wave or other surfaces, including those with a relief of 0.3 m (1 ft). Because of its maneuverability in otherwise inaccessible habitat (e.g., shallow waters) and loudness exceeding a conventional boat, the hovercraft itself would be an effective deterrence device (Lehoux 1990b).

Rivers

Deterrence of birds from river spills that are contained by booms and/or trapped in a bay could be relatively difficult (Ward 1977.) Aircraft would be useful, and shell crackers and Verey flares could be fired from boats. Because of their long range, mortars and rockets could be especially effective and may reduce the need for boat-launched devices. Mobile devices could be used for dispersing birds ahead of uncontained, advancing oil including aircraft and boat/shore launched shell crackers, flares, and mortars (Ward 1977).

Coastal Areas

Aircraft are probably the most effective techniques for initial dispersal of birds, and may be the only practical technique for coastal areas (Ward 1977). Airplane and helicopter harassment was considered effective in dispersing waterfowl during a test in Alaska and following an oil spill in Perth Amboy, New Jersey in 1976. Success varied with bird species and aircraft height. Scaup, redheads, and canvasbacks were readily deterred, but species that respond to disturbance by diving were generally not (e.g., ruddy ducks, mergansers, loons, grebes, murre, etc.) (USFWS 1977).

To prevent birds from entering contaminated areas, shell crackers, exploders, lights, reflectors, and mortars should be deployed along the shoreline. Distress and alarm calls could also be used. Along these coastal area, the logistical problem of deploying and operating a sufficient number of devices is the major limiting factor (Ward 1977). Following the Alaska oil spill of 1989, shorebirds, with emphasis on surfbirds, were hazed from the shores of Green Island with mylar tape and propane cannons over a three to four week period (P. O'Neil, pers. comm. 1993).

The effectiveness of deterrent techniques was tested along the Beaufort Sea coastline (Sharp 1978, 1987). Propane exploders and Av-Alarm® devices mounted on rafts, and helicopters were used to haze birds from a sandspit. The majority of the birds were oldsquaw (*Clangula hyemalis*). During the first day, exploders and Av-Alarms® were highly effective in dispersing oldsquaw compared to the control period (*i.e.*, reductions of 90% at 1.0 km and 0.6 km (0.62 and 0.37 mi), respectively. Exploders were less effective during the second day of operation

(90% reduction at 600 m), and were no longer effective during the third day of operation. Av-Alarms® were even less effective during the second day of operation (50% reductions at 0 to 200 m), and were not tested further. Exploders and Av-Alarms® were not effective in deterring flying birds. After three helicopter flights in the study area, bird abundance was reduced from 124 to 6. After the first helicopter pass, birds capable of flight left the area. The most successful strategy for herding birds was to slowly follow them from a distance of 70-100m (229-328 ft) at a height of up to 10 m (32.8 ft).

In Canada, an attempt was made to deter birds from marine areas offshore of marshes with a helicopter, motorboat, and explosive rounds for a 24-hr period. Low altitude helicopter flights reduced scoter numbers from 2,000 to 450. Deterrence by motorboat further reduced their abundance to 100 birds. Scoter numbers increased to 800 only 15 minutes after hazing ceased. All sea ducks departed the area following an additional hour of continual deterrence, but returned two hours later. Further hazing again caused the departure of all birds. Propane exploders were established on a beach for hazing throughout the night. During the following morning, about 1,000 scoter were gathered offshore approximately 1 km (.62 mi) from the exploder locations (Lehoux 1990a).

For seaducks in the marine environment, the following recommendations have been proposed Lehoux 1990a, (Lehoux and Cossette 1991):

- helicopters should be flown over an oil spill as often as possible with the interval between flights not exceeding 0.5 hours. The frequency of flights may be reduced if birds depart the area, especially if alternative feeding sites are available
- motorboats with a crew of two should be used if helicopters are not available for frequent flights. Flocks of birds should be located and hazed with explosive rounds
- birds should be dispersed in the same direction, preferably with or at 45degree angle to the wind to make the explosive rounds more detectible and prevent scattering in all direction.
- to locate the birds more efficiently, an observer should be stationed on a promontory and direct the boat operator by radio contact.

In coastal areas near Vancouver, Canada during September, stationary propane exploders, propane exploders detonated from a boat, and cracker shells were tested as deterrent devices (Biggs et al. 1978). Wigeon, mallard, teal, and pintail were successfully dispersed by exploders from tidal mud flats. Exploders were generally ineffective in dispersing loons, grebes, gulls, and shorebirds. During the night, exploders were effective in dispersing waterfowl, but not shorebirds. The effectiveness of exploders was related to habitat. On a continuous intertidal beach, waterfowl and western sandpipers merely moved away from the device. However, birds generally responded by departing island and narrow peninsulas. Shorebirds were not deterred from preferred feeding areas, including western sandpipers, the shorebird species most responsive to the explosions. With calm and clear weather in shallow water or on

a mudflat, the effective range for both types of exploders was approximately 300 m (984 ft). With fog, wind, and in vegetated areas, the effective distance and sound intensity was reduced. The effective hazing range was determined for 31 species of waterbirds. Although handguns and cracker shells were considered the most effective techniques for hazing or herding birds in open water areas, no single method was found to be successful, and a variety of techniques was recommended. Because loons, grebes, coots, and pigeon guillemots generally ignored the explosions or dove, the only effective technique during an oil spill would be to herd these species out of the spill area (Biggs et al. 1978).

Offshore Areas

The effectiveness of deterrent techniques in offshore areas has never been tested (Ward 1977). However, many of the techniques that are useful for shoreline areas would be impractical in offshore situations, at least until the oil could be surrounded by booms. Aircraft would be the most successful deterrent technique, but would be limited to daytime operations. Search lights mounted on boats could also be effective, but not for large spills. Throughout the day and night, rockets and mortars would probably be more effective than shell crackers and flares because of their larger area of coverage (Ward 1977).

Based on experiences derived from recent oil spills, Lehoux (1990b) stated that currently available deterrent techniques have limited efficacy. Birds generally contact oil spills when the slick moves freely on the surface of the water, and not when contacting the shore. He stated that exploders, cracker shells, flags, aluminum pie plates, and scarecrows are not effective in open waters. For offshore use, he recommended the development of an alarm buoy that could reliably follow the slick while emitting various deterrent noises. The buoy should be operational in very low temperatures, be rechargeable from conventional current outlets in several hours, have a tracking device for location and recovery, and broadcast sounds that are perceptible for 0.5 km (0.31 mi). The buoys could be dropped from a helicopter, and could be anchored along the perimeter of a slick that is not dispersing over a large area.

Ice

Birds are attracted to water that is surrounded by ice, and pools of oil on ice that resemble water, especially if open water is scarce locally (Ward 1977). Methods for dispersing birds from leads (water channels through ice), polynyas (open water within ice), and ice itself have not been tested. The potential for dispersing birds from these areas is dependent on the spill size and remoteness, and the availability of alternative areas of open water. The ability to deter birds from icebound areas may be limited by complex logistics, lack of technique testing, and necessity for long periods of deterrence because of the difficulty of cleanup operations in these areas (Ward 1977).

SUMMARY OF THE COMPARATIVE EFFECTIVENESS OF WATERBIRD DETERRENT TECHNIQUES FOR OIL SPILL APPLICATION*

SUMMARY OF THE COMPARATIVE EFFECTIVENESS OF WATERBIRD DETERRENT TECHNIQUES FOR OIL SPILL APPLICATION *

| DEVICE | MOST EFFECTIVE WITH THESE SPECIES | ADVANTAGES | DISADVANTAGES |
|--------------------------|--|--|--|
| Exploders | Waterfowl, Gulls, Herons, Seabirds (?) | Limited manpower, compliment other devices | Must be moved frequently |
| Flares | Waterfowl, Gulls, Herons, Shorebirds, Seabirds (?) | Standard technique, compliment other devices | Safety/fire hazard, must be moved frequently |
| Drumming | Waterfowl, Gulls | Inexpensive | Rapid habituation |
| Pyrotechnics | Waterfowl, Gulls, Herons, Seabirds | Large area covered, limited manpower, direction controlled | Expensive, hazard of fire |
| Shots | Waterfowl, possibly Seabirds | Large area covered, limited manpower, direction controlled | Weather/sea conditions |
| ATVs | Waterfowl, Shorebirds | Reach inaccessible areas | Marsh habitat destruction |
| Boats | Gulls, some Herons | Slow habituation | Highly species specific |
| Acoustics | Unknown | Effectiveness unknown | Effectiveness unknown |
| Pyrotechnics® | Geese, Gulls, Seaducks (?) | Effectiveness largely untested | Rapid habituation |
| Marine Alarm | Seaducks | Effectiveness unknown | Effectiveness unknown |
| Drumming | Waterfowl | Inexpensive | Rapid habituation |
| Shots and Predator Calls | Waterfowl | Inexpensive | Rapid habituation |
| Drumming | Waterfowl | Inexpensive, materials readily available | Rapid habituation |
| Reflecting Tape | Waterfowl | Inexpensive | Rapid habituation |
| Drumming | Unknown | Effectiveness unknown | Effectiveness unknown |
| Shots | Waterfowl, Gulls, some Herons | Inexpensive | May attract birds |
| Shots and Hawks | Waterfowl, Gulls | No habituation | Expensive, daytime birds to divert |
| Pyrotechnics | None | None | Ineffective |
| Flares | Waterfowl | Passive | May attract birds |
| Drumming | Waterfowl, Gulls | Inexpensive | Must be moved frequently |

* From "Waterbird Deterrent Techniques", MSRC Technical Report Series 94-003

APPENDIX C:

NORTH CAROLINA MARINE MAMMAL STRANDING NETWORK

AREA COORDINATOR:

Ms. Vicki Thayer, Area Supervisor/NMFS
1507 Ann St.
Beaufort, NC 28516
(919) 728-8714 (Office)
(919) 728-7464 (Home) (Answering Machine)

PARTICIPANTS:

Organizations:

Director, NC Aquarium/Ft. Fisher
P.O. Box 130
Kure Beach, NC 28449
(919) 458-8258

Director, NC Aquarium/Roanoke Is.
P.O. Box 976
Manteo, NC 27954
(919) 473-3494

Director, NC Aquarium/Pine Knoll Shores
P.O. Box 580
Atlantic Beach, NC 28512
(919) 247-4004

Superintendent, Cape Lookout NSS
Harkers Island, NC 28531
(919) 728-2250

Superintendent, Cape Hatteras NSS
Rt. 1, Box 675
Manteo, NC 27954-2708
(919) 473-2111

Park Superintendent
Hammocks Beach State Park
Rt. 2, Box 295
Swansboro, NC 28584
(910) 326-4881

Resources Management Specialist
Cape Lookout NSS ATTN: M. Rikard
Harkers Island, NC 28531
(919) 728-2250

Environmental Management Department
MCB, Bldg. 1103
ATTN: Mr. John Hammond
Cape Lejeune, NC 28543
(910) 451-2195

N.C. State Office of Marine Affairs
417 N. Blount St.
Raleigh, NC 27601

(919) 733-2290
Naturalist, Bald Head Island Conservancy
P.O. Box 3109
Bald Head Island, NC 28461
(910) 457-0089

North Carolina Marine Fisheries
3411 Arendell St.
Morehead City, NC 28557
(919) 726-7021

North Carolina Museum of Natural Science
102 N. Salisbury St.
ATTN: Mr. David Lee
Raleigh, NC 27601
(919) 733-7450

North Carolina State University
College of Veterinary Medicine
Raleigh, NC 27606
(919) 829-4200

INDIVIDUALS:

Dr. James Lanier (Director)
Dr. Paul Barrington
Mr. Andy Woods
Mr. Richard Roberts
NC Aquarium/Ft. Fisher
P.O. Box 130
Kure Beach, NC 28449
(910) 458-8258

Mr. Reis Collier (Biologist)
Cape Hatteras NSS
Rt. 1, Box 675
Manteo, NC 27954
(919) 473-2111

Dr. W. David Webster
University of NC/Wilmington
Dept. of Biological Science
601 S. College Road
Wilmington, NC 28403
(910) 395-3756 (Office)
(910) 799-5988 (Home)

Mr. Keith Rittmaster
c/o NC Maritime Museum
Beaufort, NC 28516
(919) 728-7317

Mr. Rhett B. White (Director)
Mr. Frank Hudgins
NC Aquarium/Roanoke Island
P.O. Box 976
Manteo, NC 27954
(919) 473-3494

Dr. Dwight Shumway, DVM
Outerbanks Animal Hospital
Outerbanks Mall, US 158
Nags Head, NC 27959
(919) 441-6066

Dr. Claire Hohenwarter, DVM
11 Barnard Dr.
Wilmington, NC 28405
(910) 251-0081 or 791-1446
(910) 762-0338 (Home)

Mr. James T. Barnes (Director)
Mr. Stuart May
Mr. Gayle Piner
NC Aquarium/Pike Knoll Shores
P.O. Box 580
Atlantic Beach, NC 28512
(919) 247-4004

OIC
Cape Lookout NSS
Harkers Island, NC 28531
(919) 728-2250

Dr. Joseph Bonaventura
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Duke University Marine Laboratory
Marine Biomedical Center
Beaufort, NC 28516
(919) 728-2111

Dr. Steven C. Jaffe, DVM
102 S. Branch Road
Wilmington, NC 28405
(910) 458-9088

Mr. George Roundtree
138 S. Colony Circle
Wilmington, NC 28409
(910) 799-8154

Dr. Susan Botts, DVM
Experimental Pathology Laboratories, Inc.
P.O. Box 12766
Research Triangle Park, NC 27709
(919) 544-8061

Dr. James E. Smallwood
Dr. Michael K. Stoskopf (Ldr. Mass Stranding Team)
Dr. Mark Cline
Mr. William (Bill) Wise
NC State Univ./College of Veterinary Medicine
Raleigh, NC 27606
(919) 829-4200

Dr. R. Guy Jaconis, DVM

1210 W. Beaufort Rd.
Beaufort, NC 28516
(919) 728-7600
Ms. Amanda Noe
408 N. 25th St.
Wilmington, NC 28405
(910) 763-3923 (Home)
(910) 251-5188 (Office)

Ms. Jean Beasley
P.O. Box 2663
Surf City, NC 28445
(910) 328-1000

Dr. Walter R. Westbrook, DVM
Newport Animal Clinic
444 Howard Blvd.
Newport, NC 28570
(919) 223-5115
(919) 726-8215 (Emergency only)

APPENDIX D(1)

The following is a list of facilities that were identified, after a preliminary search, and are worthy of further consideration.

To access a State Port Authority facility, the State OSC should contact the Director of Operations of the NCSPA. In the event that he/she is unavailable, the local terminal managers at either Wilmington or Morehead City should be contacted directly.

| | |
|--------------------------------------|----------------|
| NCSPA Director of Operations | (910) 343-6240 |
| NCSPA Wilmington Terminal Manager | (910) 343-6238 |
| NCSPA Morehead City Terminal Manager | (919) 726-3158 |

The Operations Manager or STARC Commander will attempt to ensure that adequate space is made available for the qualified wildlife responder.

| FACILITY | BUILDING SPACE | A/C & HEATING | ELECTRIC | WATER HEATING | WATER CONDITION |
|------------------------|--------------------------|------------------|----------|------------------|-----------------|
| NCSPA MHD City | enclosed * | NO A/C NO HT | YES | NO | NO |
| NCSPA Wilmington | enclosed * | NO A/C NO HT | YES | NO | NO |
| NG Armory E-City | enclosed * 5400 sq ft | NO A/C YES HT | YES | YES (200 GAL) | NO |
| NG Armory Jacksonville | enclosed * 5400 sq ft | NO A/C YES HT | YES | YES (40 GAL) | NO |
| NG Armory MHD City | enclosed * 5400 sq ft | NO A/C YES HT | YES | YES (300 GAL) | NO |
| NG Armory New Bern | enclosed * 6825 sq ft | NO A/C YES HT | YES | YES (50 GAL) | NO |
| NG Armory Shallotte | enclosed * 5400 sq ft | NO A/C YES HT | YES | YES (500 GAL) | NO |
| NG Armory Washington | enclosed * 6120 sq ft | NO A/C YES HT | YES | YES (120 GL) | NO |
| NG Armory Wilmington | enclosed * 5400 sq ft | NO A/C YES HT | YES | YES | NO |

* Availability of space is dependent upon level of commercial activity. NCSPA facilities could provide 10,000 square feet of space, if space is not being used for cargo storage.

APPENDIX D(2)

This list represents minimum facility needs for rehabilitating 100-150 oiled wildlife.

Space Requirements

| | |
|--|-----------------------|
| - Front Desk / Admissions | 300 sq. ft. |
| - Operations Office | 300 sq. ft. |
| - Kitchen / Food storage | 300 sq. ft. |
| - Rehabilitation Area (large central room) @ 3 sq. ft./ bird | 350sq. ft. |
| - Supplies / Storage | 500 sq. ft. |
| - Wildlife Cleaning Areal, | 200 sq. ft. |
| - Medical Treatment / Exam | 300 sq. ft. |
| - Pathology/ Lab / Cold storage | 150 sq. ft. |
| - Isolation Ward | 300 sq. ft. |
| - Volunteer / Worker Rest Area | 300 sq. ft. |
| - Bathrooms, Decon, Changing | 200 sq. ft. |
| - 10% Interior Passage Space | 520 sq. ft. |
| - Outside Pool Areas @ one 10' x 15' x 2' pool per 15 birds Plus access and maintenance space | 3,300 sq. ft. |
| - Nonhazardous and regulated (medical and oily) trash. Indoor | 100 sq. ft. |
| Outside | 400 sq. ft. |
| - Outside area for oily waste water. | 300 sq. ft. |
| - Loading Dock / Parking for 50 | 5,000 sq. ft. |
| Total interior sq. ft. | 5,820 sq. ft. |
| Total exterior sq. ft. | 9,000 sq. ft. |
| Total sq. ft. | 14,820 sq. ft. |

Note: If an existing wildlife rehabilitation center were to be used, it would require the above space in addition to the space allocated for any existing caseload. Animals impacted by an oil spill must be cared for separately from the in-house population.

Hot / Cold Water Capacity

When selecting a wildlife response facility it is important that the water supply will not be contaminated by the oil spill. For preplanning purposes, potential facility locations should be selected in areas of low oil spill probability. All oily waste water must be collected and disposed of in accordance with federal and municipal regulations, however the large quantities of rinse, pool and general use water is permitted access to most municipal sewage systems. It is therefore inadvisable to select a location that relies on a septic system to handle waste, for this large volume of water can exceed the designed capacity of most septic systems.

Due to the nature of oiled wildlife rehabilitation, large amounts of water are used in many locations through out the facility, it is therefore advisable that the facility has floors that can tolerate being wet, with floor drains at least in the areas designated for cleaning activities.

| | |
|--|---|
| - Cold water volume (pools and general use)* | 23,360 gallons per day |
| - Hot water volume (animal cleaning only) | 450 gph @ 104 degrees F. 6,750 gallons per day @ 15 hrs. |
| - Water Pressure (animal cleaning only) | 50 - 60 psi. |
| - Water Hardness (animal cleaning only) | 2.5-3.5 grains per gallon |

* True sea birds (diving and pelagic species) cannot be successfully rehabilitated unless the water is maintained at the proper water hardness.

A suitable facility in terms of size, availability and location should not be discounted due to hot water and hardness capacities. Provided that there is an adequate cold water supply, mobile hot water and treatment systems can be retrofitted into existing equipment

without much difficulty (see equipment and supply list appendix D).

Electric / Lighting

The electrical needs of a wildlife response facility are very similar to a conventional production operation in so far as the need for general and task lighting, with an adequate number of separately circuited outlets throughout the space capable of providing 20 amp protection. Because of potential risk of electrical shock in wet areas, the addition a GFI circuit breakers in those areas is desirable.

In addition to lighting and the HVAC system, electric power will be used for freezers, refrigerators, heat lamps, pet dryers, office and medical equipment, pool pumps and filters, power tools, etc.

- 200 amp 120 /240 volt 3-wire single phase service with minimum of ten (10) 20 amp circuits in addition to the lighting and HVAC needs, with the ability to expand.

HVAC Systems

The three main concerns regarding air quality are:

- 1) Eliminating thermal stress to debilitated animals by providing a stable, draft free inside air temperature between 70 -80 degrees F.;
- 2) Minimizing human exposure to petroleum volatiles; and,
- 3) Minimizing animals exposure to pathogenic organisms (bacterial and fungal).

- Air within a wildlife response facility should be exchanged 6 times per hour within office areas, 10 times per hour within large open spaces involving animal care, and 20 times per hour within critical care and or surgical areas.

- Typical HVAC systems used in industrial space are often forced air or closed recirculating systems which by themselves will not meet the above requirements. These systems will need to be augmented with Portable filtration (HEPA) and air exchange units. The design of these systems should be determined by the wildlife response group once the facility has been selected, and the particulars of the animal caseload is known.

- Air quality in systems that employ return air filtration can be enhanced through the replacement of the existing filters with a electrostatic type. This will not however preclude the need for HEPA type filtration and regular air exchanges as outlined above.

Communications

- Minimum of Three (3) telephone lines (public, private, fax / modem) with the ability to add as needed.

APPENDIX E

Equipment and supplies (avian species):

(S) Items should be stockpiled. Stockpiled equipment should be inventoried at each storage site and noted on a central computer file for quick reference. Condition of supplies and equipment should be assessed every six months.

(P) Items should not be stockpiled. Purchased and/or available within 24 hours of the incident. The availability of these items should also be checked every six months.

Operations Control:

- Operations Manual (designed in advance) (P)
- Copies of all forms (designed in advance) (P)
- Maps of impacted area (P)
- Animal identification and natural history books (P)
- Portable computer w/database, spreadsheet, word processing programs & blank discs (P)
- Portable printer and printer paper (P)
- Copier and Fax machines (P)
- Cellular phones and beepers (P)
- Marine radios (handheld) (P)
- Calculator (P)
- Binoculars (P)
- General duty extension cords and adapters for office equipment hook-up (S)
- Folding tables 3'x6' and or 3'x8' (S)
- Manila folders, writing paper, poster boards, file folder box, clip boards (P)
- Waterproof markers, pens, rulers, pencils, highlighters (P)
- Tape: adhesive, paper, duct, scissors (P)
- Large signs, including "Quiet", "Cleaned Animals", "Oiled Animals", "Medical Treatment", "Clean Linens", "Newspaper", "Dirty Laundry", "Volunteer Area", "No Admittance", etc. (P)
- Staple gun, staples, remover, push pins, paper clips (P)
- Name tags, badges (P)
- First Aid Kit (humans) (P)
- Fire extinguishers and air horn (S)
- Folding metal table, chairs and cooler for volunteer break-out area (S)
- Meals and fluids for volunteers geared towards maintaining good hydration and energy levels (P)

Medical:

- Exam Tables (P)
- Work counters with lower storage compartments (P)
- Desk and chair (P)
- Utility sink (P)
- Microwave (P)
- Clock (P)
- Stools (P)
- Portable HEPA filtration units (P)
- Plastic, numbered leg bands of varied sizes (P)
- Indelible markers, pens, pencils (P)
- Workbooks, exam forms, clipboards (P)
- Towels (P)
- Thermometers for medical use, with calibration up to 108 degrees F. (Rectal) (P)
- Lubricants such as KY jelly or Vaseline (P)
- Penlights (P)
- Stethoscope (P)
- Cotton balls, Q-tips®, gauze squares, cloth squares (P)
- Peroxide (P)
- Alcohol (P)

Sterile Saline (P)
 Eye wash bottles (P)
 Digital gram scale (P)
 Tube-feeding materials, see rehabilitation (P)
 A large volume of electrolyte solutions such as Pedialyte® or Lactated Ringer's for oral use. (Limited shelf life) (P)
 Pepto-Bismol® (an enteric coating agent) (P)
 Sterile electrolyte solution such as Lactated Ringer's (2.5% dextrose) or Normosol R® (Limited shelf life) (P)
 Sterile syringes (1cc-60cc), needles and pediatric- sized butterfly catheters or scalp vein and IV sets (18-25 gauge). (Limited shelf life) (P)
 Sharps container (P)
 Multitest sticks (P)
 Disinfectant, Roccal D (P)
 Panalog® cream (P)
 General Pharmaceuticals
 Non-steroidal ophthalmic antibiotic solution (P)
 A broad spectrum systemic antibiotic having a wide safety margin (P)
 Dexamethasone sodium succinate (P)
 Injectable sodium bicarbonate (P)
 An euthanasia solution (P)
 Antiseptic solutions such as povidine iodine or chlorhexidine for cleansing (S)
 Injectable anesthetic agents (P)
 Emergency drugs: cardiac and respiratory stimulants (P)
 Bandaging materials: Sterile gauze wrap, Tegaderm®, Telfa®, cloth tape, Micropore® tape, Kling® gauze, Vetrap® and Elastikon® tape (P)
 Sterile instruments (P)
 Necropsy instruments, 10% formalin and small containers (P)
 Equipment for simple diagnostic and research purposes: microscope, microscope slides and cover slips, hematocrit tubes and clay, centrifuge, refractometer, blood collection tubes, culturettes (P)
 Aluminum foil, duct tape, trash bags, zip-lock bags (P)
 Plastic cups (P)
 Refrigerator (P)
 Freezer for dead animal storage (P)
 Portable (human) eye flush station (P)
 Protective gloves, surgical masks, protective goggles, aprons and Tyvek® clothing (P)

Surgery equipment and supplies (optional)

Stainless steel surgical table (P)
 Scissors, hemostat, forceps (P)
 Stainless steel pan (8"x5"x2") (P)
 Allis tissue clamps (P)
 Scalpel handle and blades (P)
 Towel clamps (3.5 Backhaus) (P)
 Needles (assorted), holder (5.5 Olsen/Hegar), sutures (P)
 Disposable drapes (P)
 Surgical caps, gloves, and masks (P)
 Instracal (sterilizing liquid) (P)
 I.V fluid stand (P)
 Small animal anesthetic machine (Isoflurane vaporizer) (P)
 Endotracheal tube (P)
 Esophageal stethoscope (P)
 Oxygen (P)

Cleaning:

Pens, black and red waterproof markers, calculator, resource information (P)
 Gauntlet style butyl or neoprene gloves (S)
 Barrier cream (S)
 Ankle length vinyl aprons (S)
 One piece Tyvek® coveralls (S)
 16" high vinyl work boots (S)
 Non-fogging goggles (S)
 Dawn® dish washing detergent (S)
 Allow 1-3 gallons per animal (depending on the size of the animal and the degree on contamination).
 Pretreatment agents (if needed, will be determined when type of oil and species involved is known) (P)
 17 gallon round galvanized tubs with lids (12-24) (S)
 Photographic thermometers calibrated to 120 degrees F, with hanging clips (S)
 Strong water resistant cleaning tables 96"L x30"W x 28"H (4-8) (S)
 Strong water resistant supply tables 96"L x30"W x 28"H (2-4) (S)
 Pretreatment and staging tables 30"L x 30"W x 28"H (2-4) (S)
 Free standing utility sink for rinsing (no fixtures other than drain hook-up requirements) with a plastic milk crate type insert, and a dish rack drain mat on top (2-4) (S)
 Non-slip self draining anti-fatigue floor mats (S)
 High capacity self-priming electric water or sewage pump on GFI switch with input and discharge hose, capable of withstanding hot water and cleaning debris i.e., feathers, fur, etc. (S)
 High capacity hot water source - tankless propane on-demand hot water heaters that can deliver a 90 degree F rise in water temperature at 3 GPM continuously (minimum of two units). Electric units will not produce an adequate level of BTU's and may not be compatible with the existing electrical services (S)
 Hot/Cold water temperature control mixing valves, accurate +/- 2 degrees (S)
 Water treatment equipment for hard/soft water that automatically regenerates and requires a minimum amount of maintenance (P)
 Water pressure pump that can deliver a 90 psi rise at 3 GPM (S)
 100' outdoor type 20 amp capacity extension cords (3) (S)
 Heavy duty outdoor type triple outlet adapters (3) (S)
 25' garden hoses (8-12) (S)
 Shower heads with in-line shut off valves, adapted for garden hose threads (S)
 In-line ball type garden hose shut off valves (12) (S)
 3"x3" gauze pads, Q-Tips®, toothbrushes and wash cloths (S)
 Water Pic® (S)
 Eye flush and one quart squirt bottles (S)
 Plastic quart and gallon pitchers, and 5 gallon buckets (S)
 Bath and dish towels, wash cloths (S)
 55 gallon drums (40+) or 300-500 gallon waste water storage tanks (4+) with lids and lid wrench (P)
 Birm for waste water containment area (P)
 50 gallon trash containers on wheels for general trash, laundry and recyclable, with liners (10) (S)
 Tool kit equipped to handle minor plumping, electrical and mechanical problems (S)
 Duct tape, Teflon tape, electrical tape, electrical wire twist nuts, PVC pipe cleaner and cement, pipe compound
 14" pipe wrench, 8" and 12" adjustable wrenches, 10" channel locks, 10" vise grips
 Electrical wire strippers, heavy duty diagonal cutters, hack saw and blades, utility knife
 Hammer, #10 common nails
 Flashlight and batteries
 Small and large slotted and Phillips head screwdrivers
 Assortment of hose clamps, rubber washers, garden hose Y connectors, male and female hose end splice kits
 Water pressure gauge, hardness and pH water test kits, electrical circuit tester

Garden type spray nozzles (3), floor squeegee, sponge mops, wet/dry vacuum

Husbandry:

One piece Tyvek® coveralls (S)
16" high vinyl work boots (S)
Ankle length vinyl aprons (S)
Butyl or neoprene gloves (S)
Non-fogging goggles (S)
Tool kit for cage construction and general maintenance (S)
 Circular and reciprocating saw with additional blades
 Hammer, mallet and an assortment of nails
 Cord and cordless drill with drill index and extra batteries
 Large and small slotted and Phillips head screw drivers and an assortment of screws
 14" pipe wrench, 8" and 12" adjustable wrenches, 10" channel locks, 10" vise grips and socket wrench set
 Tape measure, level, carpenter and framing squares
 Duct tape, teflon tape, electrical tape
 Heavy duty extension cord (100')
 Staple gun and staples
 Assortment of hose clamps, rubber washers, garden hose Y connectors, male and female hose end splice kits
 Heavy duty scissors, utility knife and blades
 Flashlight and batteries
Plywood and structural lumber to build pens and pool (P)
Nylon netting (rolls 0.5" to 1" mesh) (S)
Soft-sided baby play pens (S)
Sky Kennels® (medium and large) (S)
Rolls of polyethylene (a minimum of two 8x100 foot rolls of 4-8 mil), (S)
Pen flooring and perching material (species specific) (P)
Heavy duty waterproof 20'x20' polyethylene grommetted tarps to be used as pool liners (S)
Pools for swimming cleaned animals (size and depth is species specific) (P)
25' and 50' garden hoses with nozzles (5 each) (S)
High capacity self-priming electric water or sewage pump on GFI switch with input and discharge hose, capable of handling debris i.e., feathers, fur, animal waste, etc. (S)
1/4 hp heavy duty sump pumps for small pool drainage (S)
Pool filtration system (P)
Sea salt (bags and tablets) (P)
Heavy duty extension cords (25'-50'-100') (S)
Heavy duty multiple-outlet strips (S)
Portable space heaters (electric) (S)
Portable air circulating equipment (S)
Portable HEPA® filtration units (S)
Brood Rite® heaters 240,500.750 watt units (S)
Conical ceramic 150 watt infra red heat lamps (S)
Clamp on heat lamp fixtures and cord sets with in-line switch (S)
High speed pet dryers (S)
Kennel type heating mats (S)
Sheets and towels of various sizes (S)
Safety and clothes pins (S)
Astro-bubble® bedding (rolls) (S)
Paper towels and rack, handy wipes, sponges (S)
Dishpans and soap (Dawn®) (S)
Refrigerator and Freezer (minimum of 20 cubic feet each) (S)
Work counters with lower storage compartments (S)
33 gallon metal garbage cans with wheels and lids for food storage (S)
Heavy duty blender, food processor, can opener and microwave (S)
Assortment of measuring cups and spoons (S)
Plastic 2-quart pitchers (S)

Carving, boning, fillet knives and sharpener (S)
Poultry scissors (S)
Cutting boards (S)
Shell or crab cracking hammers (S)
Multi-animal feeder (S)
Food and water containers of assorted sizes (S)
Food strainers (S)
Vitamin supplements (species specific) to be determined at the time of the incident (P)
Animal food (species specific) to be determined at the time of the incident (P)
Pedialyte® baby fluid (P)
Assorted syringes (10cc-60cc) (allow 30 for every dozen birds) (P)
Foley catheters (12-16 gauge) and adapters (order 12 adapters, 30 catheters for every dozen animals) (P)
5 gallon buckets with handles (S)
Plastic totes (small to large) for food storage (S)
Shelving for storage (S)
Quart size plastic spray/ misting bottles (S)
Capture pole nets, handling gloves and control poles (S)
Digital gram scale for weighing animals (S)
Erasable marking boards (S)
Husbandry record forms and clip boards (S)
File cabinet or storage box (S)
Permanent markers (Sharpie®: medium and fine point) (S)
Scissors and paper clips (S)
Wall mounted room thermometers (S)
Pool thermometers (S)
Fire extinguishers (S)
Flashlights and batteries (S)
Portable work lights and stands (S)
Disinfectant (S)
Brooms, floor squeegees, mops and cleaning agents (use with caution in wildlife areas) (S)
33 gallon plastic garbage cans with wheels, lids and liners for trash (S)
Heavy duty wet dry vacuum (S)
Bird bands and bird color marking supplies (P)

Hazing and retrieval equipment:

Tyvek® coveralls (assorted sizes) (S)
Butyl and neoprene gloves (assorted sizes) (S)
Heavy gloves for raptors and mammals (S)
Non-fogging goggles (S)
Boots and hip waders (S)
Rain gear (assorted sizes) (S)
Flotation vest and suits (S)
Sunscreen lotion and insect repellent (S)
First aid kit (humans) (S)
Field glasses (7x35) (P)
Spot lights (S)
Animal identification and natural history books (P)
Field forms and clip boards (P)
Maps of impact area (P)
Cellular phones and beepers (P)
Marine radios (handheld) (P)
Indelible markers, pens, pencils (P)
Rags, towels and absorbent pads (S)
Collapsible waxed cardboard animal carriers (small and large) (S)
Duct tape (S)
AV- Alarms® (S)

Phoenix Wailer® (S)
Propane cannons (three minimum) (S)
20-lb. propane tanks (two per cannon) (S)
Revolving stroboscopic lights (S)
Scarecrows and scare tape, nylon cord and stakes (S)
Cracker shells (S)
Shotgun (12-gauge) (P)
Long handled pole nets (S)
Hoop and cast nets (S)
Seine nets (S)
Nylon netting, cable ties, stakes and mallet (S)
Cannon and gun launched nets (S)
Decoys and animal calls (for baiting) (S)
Shallow draft water craft (size and type will depend on conditions) (P)

APPENDIX F

THE EFFECTS OF OIL SPILLS ON WILDLIFE Tri-State Bird Rescue & Research, Inc. **SAMPLE AGENDA TOPICS**

WELCOME - Sponsoring agency

GOALS OF MEETING

OVERVIEW OF THE EFFECTS OF OIL ON WILDLIFE

Illustrating the internal and external effects of oil and basic treatment guidelines.

BEHAVIOR OF SPILLED OIL

Physical and chemical behavior of spilled oil, and methods of containment and recovery.

INITIATING A WILDLIFE RESPONSE

Audience participation - oil spill scenario.

TRUSTEE RESPONSE PLAN

SEARCH AND RESCUE

Techniques for preventing animals from becoming oiled. Understanding the behavior of oil contaminated wildlife.

SPECIAL CONSIDERATIONS IN TREATING WILDLIFE

Effects of handling and captivity on wild animals, disease concerns, and criteria for release.

DEMONSTRATION OF MEDICAL CARE

WILDLIFE HUSBANDRY

Housing and nutritional needs of wildlife in captivity.

DEMONSTRATION OF CLEANING

HUMAN HEALTH AND SAFETY

Health risks associated with petroleum products, right-to-know information, personal protection equipment.

FACILITIES MANAGEMENT

The logistics of establishing and managing a wildlife response facility.

WILDLIFE PATHOLOGY

SUMMARY

APPENDIX G (NC WCP)
NORTH CAROLINA WILDLIFE AND OIL SPILLS WORKSHOP
ATTENDEES/APPRENTICE LIST
SEPTEMBER 8-9, 1993
BEAUFORT, NORTH CAROLINA

WORKSHOP PRESENTED BY:

TRI-STATE BIRD RESCUE & RESEARCH, INC.

(Qualified Wildlife Responder)

110 Possum Hollow Road

Newark, DE 19711

Office phones: (302) 737-9543, 737-7241

24 hour Oil Spill Emergency Pagers: 1-800-710-0695, 0696

| | |
|-------------------------|------------------------|
| David Allen | Grady Barnes |
| NC Wildlife Resources | NC Wildlife Resource |
| Commission | Commission |
| 550 Tenmile Fork Road | 512 N. Salisbury St. |
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